THE

AMERICAN REVIEW OF TUBERCULOSIS

ABSTRACTS OF TUBERCULOSIS

VOLUME VI APRIL, 1922 ABST. No. 2

Army Life and Tuberculosis.—It has been suggested that one of the causes for the rapid decline of tuberculosis since the close of the war was probably the induction into armies of large numbers who, previously, especially in city life, were engaged in sedentary occupations, and who, being thrust into active outdoor life, were thereby strengthened and made healthier. This ignores the fact that, especially in the United States and England, medical examinations of all candidates were first made, and that only those obviously fit were accepted. The result was a weeding out of all definite and even some suspicious cases of tuberculosis from the army group, and, if anything, the mortality among soldiers should have been much lower than in the remaining population, as they were a healthy, selected number. It must also be added that against compensations resulting from more active, open-air and regulated habits of life, there were all the hardships of war itself. In New York City, with the figures of the age composition of the population for 1910 and 1920 censuses available, it is possible to study the mortality of certain groups among men and to trace the influence of army life, if any, in affecting, differently from the other and more general causes, the recent tuberculosis decline. In the accompanying table may be studied the detailed specific death rates of the past ten years in New York among males divided into three age-groups: the first, those under 20 years of age; the second, those between 20 and 34, among whom it is assumed are represented the bulk of New Yorkers who were in the army, since those taken by the draft were between 21 and 31 years of age; the third, those of 35 years of age and over. The two periods selected for comparison are 1910 and 1911, and 1919 and 1920. These were chosen because the age distribution of men in New York was then more accurately known by reason of the proximity of these years to the national census. In the two years 1910 and 1911, the death rate from

Tuberculosis mortality in New York City among males, of different age groups, before and after the war*

NEW YORK	AGE GROUPS (MALES)			
	0–19 years	20–34 years	35 and over	All ages
All tuberculosis deaths in 1910 and 1911	1,823	4,068	7,009	12,900
Annual population exposed 1910–1911	910,362	735,097	769,894	2,413,353
Tuberculosis* deaths in 1919 and 1920	1,297	2,901	5,359	9,557
Population exposed (January 1, 1920)	1,020,945	840,791	940,902	2,802,638
Death rate per 100,000, period 1910–1911	100.1	277.4	455.1	267.2
Death rate per 100,000, period 1919–1920	63.5	172.5	284.7	170.5
Reduction in death rate per 100,000	36.6	94.9	170.4	96.7
Per cent decrease in death rate	36.6	34.2	37.4	36.1

* All forms of tuberculosis.

tuberculosis of all forms was 100 per each 100,000 for all of the male sex under 20 years of age; for those between 20 and 34, 277; for men of 35 years and over, 455. In the two years of 1919 and 1920 the death rates for the same three groups were respectively 64, 173, and 285 per each 100,000 population at those ages. The reduction in the tuberculosis death rate in the last mentioned two years, as against the rate prevailing in 1910 and 1911, was 36.6 per cent for all under 20 years, 34.2 per cent for those of the military age group between 20 and 34, and 37.4 per cent for those 35 years of age and over. It is therefore obvious that, at least among men of military age from New York City, the reduction in the tuberculosis mortality was no greater than that occurring at other ages.—*"Army Life" and Tuberculosis, Bull. New York Tuberculosis Association, January–February, 1922, iii, 6.*

Increase of Tuberculosis among Adolescent Girls.—Despite the very pronounced decline in the mortality from tuberculosis which has taken place during the last decade, the disease is actually increasing among girls between the ages of fifteen and twenty years. This is shown clearly by figures compiled by the Metropolitan Life Insurance Company which relate to the ten-year period 1911 to 1920. Adolescent girls constitute the only group in which the tuberculosis death rate has not declined. The Company's compilations show that during the six-year period 1911 to 1916 the average annual death rate from tuberculosis among white girls, aged 15 to 19 years and insured in its Industrial Department, was 144.5 per 100,000; by 1919, this rate had increased slightly (to 145.8), and in 1920 it rose further to 151.5. These increases, it is true, are small; ordinarily, they would not be commented upon. They become very important and significant, however, by virtue of the strong contrast which they present to the trend of tuberculosis mortality among both females and males of other age groups. For example, women from 20 to 24 years had an average death rate from tuberculosis of 238.0 per 100,000 during the six-year period 1911 to 1916; by 1919, this had decreased to 228.4; in 1920, there was a further and very substantial drop to 213.8. For insured white women aged 25 to 34 years a death rate of 252.2 was recorded for the six-year period 1911–1916; by 1919, the figure had declined to 214.3 and in 1920 there was a further drop to 190.5. During the same time that the tuberculosis death rate of adolescent white girls was increasing 5 per cent the mortality among adolescent white boys was decreasing 25 per cent.—*Tuberculosis Is Increasing among Adolescent Girls, Statistical Bulletin, Metropolitan Life Insurance Co., December, 1921, ii, no. 12, 3.*

Experimental Tuberculous Serous Pleurisy.—In guinea pigs tuberculous serous pleurisy could be provoked by tuberculous toxin.—*Experimental Study on the Development of Tuberculous Serous Pleurisy, E. Umemoto, (Jikken Igaku Zasshi, March, 1921, iv). Japan Med. World, July 15, 1921, i, no. 3, 24.*

Mortality from Tuberculosis, 1920.—The Bureau of the Census announces that nearly 100,000 deaths were due to tuberculosis in the death registration area of the United States in 1920, and if the rest of the United States had as many deaths from this cause in proportion to the population, the total number of deaths from tuberculosis in the entire United States for 1920 was about 122,000, whereas for 1919 the number is estimated as 132,000, or 10,000 more than for 1920. The trend of the tuberculosis death rate is downward. In the registration area of the 33 States, which show rates for more than one year, 29 in the following table show their lowest rates for the year 1920. The tuberculosis death rate in the registration area in 1920 was 114.2 per 100,000 population, against 125.6 per 100,000 population for the year 1919. To permit better interstate comparisons for the year 1920, adjusted rates based on the standard million population have been calculated. The highest adjusted tuberculosis rate for 1920 is 215.7 per 100,000 population for the State of Colorado, and the lowest is 40.8 per 100,000 population for the adjoining State of Utah. The high rate for Colorado is evidence not of unhealthfulness of climate, but of the attractiveness of the Colorado climate to persons afflicted with tuberculosis. For the States in which at least 10 per cent of the population was colored, adjusted rates have been calculated separately for the white and colored populations. In this group of States the highest adjusted tuberculosis rate for the white population is 137.6 per 100,000 for Kentucky, and the highest adjusted rate for the colored population is 354.9 per 100,000 population for the same State. The lowest adjusted tuberculosis rate for the white population is 54.2 for Mississippi, and the lowest for the colored population is 175.2 per 100,000 population for Florida.

Deaths and death rates from tuberculosis (all forms) in the registration area (exclusive of Hawaii) and in the registration States, 1916–1920

AREA	NUMBER OF DEATHS			ADJUSTED RATE	RATE PER 100,000 POPULATION				
	1920	1919	1918	1920	1920	1919	1918	1917	1916
Registration area	99,916	106,985	122,040	[1]	114.2	125.6	150.0	147.1	142.1
Registration States (1916)[2]	79,489	86,070	100,946	[1]	113.1	124.2	147.7	142.9	139.6
California	5,555	5,910	6,094	147.6	159.6	175.3	186.7	177.2	174.6
Colorado	2,134	2,005	2,229	215.7	225.4	215.1	242.9	194.8	176.6
Connecticut	1,666	1,729	2,062	116.8	119.4	126.5	153.9	160.4	142.5
Delaware	327	363	[3]	142.5	146.0	163.6	[3]	[3]	[3]
Florida (total)	1,021	1,003	[3]	106.4	104.1	104.8	[3]	[3]	[3]
White	435	471		67.7	67.1	74.9			
Colored	586	532		175.2	176.8	161.6			
Illinois	6,568	7,395	8,626	97.0	100.6	114.9	135.7	[3]	[3]
Indiana	3,201	3,331	4,057	105.7	108.8	114.1	140.2	139.5	134.6
Kansas	855	894	1,050	47.4	48.2	50.6	59.8	59.8	57.3
Kentucky (total)	3,705	3,982	4,770	159.7	152.9	165.3	199.0	198.8	195.2
White	2,851	3,109	3,651	137.6	130.3	143.1	169.3	166.1	163.7
Colored	854	873	1,119	354.9	363.8	367.8	466.0	486.1	467.4
Louisiana (total)	2,550	2,577	3,301	149.1	141.2	143.9	185.8	[3]	[3]
White	894	879	1,169	86.9	80.9	80.8	109.0		
Colored	1,656	1,698	2,132	244.0	236.2	241.7	302.9		
Maine	799	793	927	100.2	103.8	103.4	121.4	117.1	118.2
Maryland (total)	2,139	2,390	2,959	144.1	146.7	165.8	207.6	195.9	195.6
White	1,337	1,549	1,930	106.5	110.4	129.4	163.1	150.8	148.6
Colored	802	841	1,029	325.3	326.6	344.2	423.4	413.6	420.8
Massachusetts	4,412	4,901	6,005	110.0	113.8	128.0	159.0	145.9	149.2
Michigan	3,101	3,106	3,588	82.7	83.6	85.7	101.5	96.6	92.7
Minnesota	2,151	2,246	2,446	88.2	89.5	94.7	104.6	102.1	104.8
Mississippi (total)	2,287	2,436	[3]	138.6	127.8	136.0	[3]	[3]	[3]
White	410	488		54.2	47.8	57.3			
Colored	1,877	1,948		213.4	201.2	207.1			
Missouri	3,644	3,984	4,891	102.5	106.9	117.2	144.4	149.2	143.0
Montana	419	480	506	70.2	75.1	88.9	96.8	108.8	107.1
Nebraska	561	[3]	[3]	42.9	43.0	[3]	[3]	[3]	[3]
New Hampshire	430	453	556	94.7	97.0	102.5	126.1	113.9	114.5
New Jersey	3,635	3,978	4,817	110.7	114.0	127.4	157.4	154.3	151.1
New York (total)	12,634	14,538	17,113	114.5	120.9	140.9	167.9	166.3	160.6
White	11,848	13,582	16,149	109.6	115.8	134.4	161.8	161.1	155.4
Colored	786	956	964	352.3	362.8	455.7	475.0	429.4	422.2
North Carolina (total)	3,004	3,110	3,475	131.8	116.5	122.4	138.7	137.8	147.1
White	1,491	1,521	1,649	93.8	82.8	86.0	94.7	94.2	101.5
Colored	1,513	1,589	1,826	220.2	194.2	205.9	238.8	236.4	249.4
Ohio	5,975	6,539	7,634	99.1	102.8	114.6	136.2	134.8	126.4
Oregon	703	704	675	86.2	89.1	90.6	88.1	[3]	[3]
Pennsylvania (total)	9,213	10,327	12,968	104.0	105.0	119.1	151.6	138.6	133.0
White	8,267	9,334	11,746	96.7	97.5	111.4	141.8	129.1	125.4
Colored	946	993	1,222	312.1	324.1	351.3	447.0	438.0	373.5
Rhode Island	798	895	1,080	127.5	131.3	148.8	181.5	172.9	175.9
South Carolina (total)	2,031	2,271	2,395	135.6	120.0	135.6	144.5	144.8	146.1
White	540	552	541	73.2	65.5	68.0	67.9	70.0	67.0
Colored	1,491	1,719	1,854	197.2	172.0	199.0	215.4	213.0	217.2
Tennessee (total)	3,860	3,938	4,786	175.2	164.6	169.0	206.8	199.1	[3]
White	2,451	2,376	2,817	129.3	129.3	126.6	151.5	155.6	
Colored	1,409	1,562	1,969	315.5	312.6	344.9	432.5	374.5	
Utah	177	200	209	40.8	39.1	44.8	47.8	44.6	50.7
Vermont	288	321	369	77.7	81.8	91.1	104.4	93.4	110.8
Virginia (total)	3,319	3,445	4,170	151.9	142.9	150.1	183.6	169.8	174.9
White	1,545	1,567	1,996	100.6	94.8	97.5	126.1	109.2	118.4
Colored	1,774	1,878	2,174	270.0	256.2	272.0	315.9	307.6	301.7
Washington	1,346	1,385	1,371	95.6	98.4	103.0	103.5	100.2	97.5
Wisconsin	2,267	2,202	2,440	85.1	85.6	84.1	94.4	97.3	92.1

[1] Rate not calculated.
[2] Including the District of Columbia.
[3] Not admitted to registration area until a later date.

—*U. S. Pub. Health Reports, January 13, 1922, xxxvii, 53.*

Death Rate* from All Forms of Tuberculosis in American and European Cities During 1920†

AMERICAN CITIES	MID-YEAR POPULATION	TUBERCULOSIS DEATH RATE	EUROPEAN CITIES	MID-YEAR POPULATION	TUBERCULOSIS DEATH RATE
Denver, Colorado	256,791	316	Vienna, Austria	1,842,005	405
Los Angeles, Calif.	600,000	175	Budapest, Hungary	§	376
Cincinnati, Ohio	403,418	161	Warsaw, Poland	§	338
Philadelphia, Pa.	1,837,924	137	Prague, Czecho-Sl'kia.	487,000	324
St. Louis, Missouri	772,897	134‡	Florence, Italy	248,587	298
Indianapolis, Ind.	314,194	132	Paris, France	2,905,248	279
Newark, N. J.	414,216	130	Koln, Germany	656,617	189
San Francisco, Calif.	520,546	128	Leipzig, Germany	621,351	179
Boston, Mass.	751,251	127	Berlin, Germany	1,931,330	177
New York, N. Y.	5,663,980	126	Liverpool, England	781,948	173
Pittsburgh, Pa.	591,033	119	Dusseldorf, Germany	414,900	172
Milwaukee, Wis.	457,147	117‡	Amsterdam, Holland	650,758	156
Cleveland, Ohio	808,268	108	Hamburg, Germany	1,011,000	152
Buffalo, New York	519,608	102	Glasgow, Scotland	1,098,568	149
Chicago, Illinois	2,728,022	97	Manchester, England	786,293	138
St. Paul, Minn.	290,000	89	London (Co. of), Eng.	4,531,971	127
Washington, D. C.	437,571	85	Edinburgh, Scotland	336,923	124
Rochester, N. Y.	295,000	76	Birmingham, England	910,000	110
Portland, Oregon	295,000	75	Bradford, England	293,979	107

* Per each 100,000 population.
† From New York Department of Health Bulletins, July 9, October 15, 1921.
‡ Includes death in city institutions outside town limits.
§ From Bulletin, League of Red Cross Societies, Geneva, July-August, 1921.
—*Table compiled by G. J. Drolet, Bulletin, New York Tuberculosis Association, January-February, 1922, iii, 7.*

Tuberculosis Mortality and Morbidity in New York City in 1921.—A fall of 18 per cent in the tuberculosis death rate in New York City is the record for 1921. The total number of deaths from tuberculosis of all forms reported during the past year was 5,922, and the death rate was therefore 103 per 100,000 inhabitants. In 1920, the total deaths were 7,135 and the rate 126. Tuberculosis caused 1,213 fewer deaths in New York during 1921 than the year before. Up to 1919, tuberculosis, in New York City, took annually some 10,000 victims. In 1910, when the city contained a million less people, the deaths from this disease totaled 10,074, and the rate was 210 per 100,000 people. If the death rate of that year had prevailed in 1921, when the city's population was estimated at 5,751,859, the number of deaths would have been 12,079, whereas there actually occurred only 5,922. The saving of lives from tuberculosis was therefore 6,157 during the last year alone. The death rate of 1921 at 103 is less than half of what it was twelve years ago in 1910, when it was 210, the reduction for the past twelve years being 51 per cent. The detailed figures and rates for both pulmonary and other forms of tuberculosis since 1910 are given in table 1. It is of special interest to study the course of tuberculosis other than pulmonary, such as the lymph node, bone, and meningeal forms, which are mostly confined to children. For a decade previous to the general pasteurization of milk, now in force in New York City, (except in the rarely used certified variety) the death rate had oscillated only between 27 and 30 per 100,000; but since the general enforcement of that measure, in 1915, the effect has been quickly felt, and the rate has steadily fallen to 13.5 in 1921. The general reports concerning tuberculosis outside of New York City are that it is also decreasing, though to what extent is not yet known for the entire year. However, the registered mortality in the State of New York, outside of New York City, which is composed mainly of rural communities, is available for the first nine months of 1921, and the death rate for that period from pulmonary tuberculosis is estimated at 89 as against a rate of 103 during the same months of 1920. The latter figures would indicate, therefore, that, in the upper part of the state, which also includes the health resorts in the Catskills and the Adirondacks, the tuberculosis mortality in 1921 will show a reduction of

TABLE 1

New York City tuberculosis mortality, 1910 to 1921

YEAR	NUMBER OF TUBERCULOSIS DEATHS			RATE PER 100,000 POPULATION		
	Pulmonary	Other forms	All forms	Pulmonary	Other forms	All forms
1910	8,692	1,382	10,074	181	29	210
1911	8,790	1,460	10,250	180	30	210
1912	8,591	1,390	9,981	173	28	201
1913	8,601	1,430	10,031	171	28	199
1914	8,918	1,372	10,290	178	27	200
1915	8,825	1,424	10,249	169	27	196
1916	8,411	1,237	9,648	159	23	182
1917	8,825	1,317	10,142	164	24	188
1918	8,779	1,319	10,098	160	24	184
1919	7,395	1,103	8,498	132	20	152
1920	6,165	970	7,135	109	17	126
1921	5,143	779	5,922	89	14	103

Population of New York City according to Federal Census.

April 15, 1910.....4,766,883
January 1, 1920.....5,620,048

Rates during intercensus years are based upon the estimated mid-year populations, according to arithmetical progression.

14 per cent. The combined mortality figures of forty-one American and Canadian Life Insurance companies for the first ten months of 1921 contained 22,443 deaths from all forms of tuberculosis, as against 25,288 during the same period in 1920, the death rate being respectively 100 in 1921 and 118 in 1920. The 1921 rate, in this very large group scattered all across the continent, therefore also shows a reduction of 15 per cent over that of the year before. Figures of pulmonary tuberculosis during 1921 are available for the five boroughs comprising the Greater City of New York and the details in table 2 show the usual difference among them. The Borough of Manhattan had, as usual, the highest mortality, the rate in that borough being 110 as against that of 89 for pulmonary tuberculosis for the entire city. The lowest death rate, 69, occurred in the Borough of Queens. The latter borough is the largest in area and has been noted lately for its home building development. Brooklyn and the Bronx, likewise, had the low pulmonary tuberculosis death rate of 76. Richmond, on the other hand, showed an actual increase. The number of deaths reported for this borough is not very large. The accuracy of the Richmond figures may be open to question, because of the presence, in that section, of the large

TABLE 2

Pulmonary tuberculosis mortality in each borough of New York City, 1920 and 1921

	NUMBER OF DEATHS FROM PULMONARY TUBERCULOSIS		MORTALITY RATE PER 100,000 POPULATION		CHANGE IN DEATH RATE
Borough	*1920*	*1921*	*1920*	*1921*	*per cent*
Manhattan...	2,916	2,501	128	110	Dec. 14
Bronx.....	689	588	92	76	Dec. 17
Brooklyn	1,959	1,571	96	76	Dec. 21
Queens.....	480	344	101	69	Dec. 32
Richmond ...	121	139	103	115	Inc. 10
City.....	6,165	5,143	109	89	Dec. 18

municipal tuberculosis hospital at Sea View and the difficulty of charging to the other boroughs all the deaths of non-residents occurring in that institution. The City of New York was the first to enforce the registration of living cases of pulmonary tuberculosis, and its figures, though acknowledged as being perhaps incomplete, are the best available for a study of the morbidity from that disease in a large community. In 1921 there were 12,966 new cases of pulmonary tuberculosis reported by physicians among their patients. In 1920 the number was 1,069 larger, being actually 14,035. On the basis of the present population of the city, the 1921 notifications represent a morbidity rate for pulmonary tuberculosis of 225 per each 100,000. A better way, perhaps, of studying tuberculosis morbidity in the city, is to consider, instead, the total registration of all cases, new and old, known to the city authorities on a given day of the year. The total number of known living cases of pul-

TABLE 3

Pulmonary tuberculosis morbidity in New York during 1921

BOROUGHS	POPULATION 1921 (a)	NEW CASES REPORTED IN 1921		TOTAL REGISTRATION ON DEC. 31	
		Number	Rate (b)	Number	Rate (b)
Manhattan.....	2,276,778	7,010	310	14,655	644
Bronx.....	778,528	1,476	190	3,490	448
Brooklyn.....	2,077,674	3,704	178	6,924	333
Queens.....	497,627	613	123	1,429	287
Richmond.....	121,252	163	134	322	266
New York.....	5,751,859	12,966	225	26,820	466

(a) Estimated as of July 1. (b) Per each 100,000 population.

monary tuberculosis in New York City on the last day of 1921 was 26,820, which represented a morbidity rate of 466 per each 100,000 inhabitants. The registration included 226 children under five, 2,042 between the ages five and sixteen, and 24,552 adults over sixteen. The morbidity rate from tuberculosis is highest in the Borough of Manhattan and lowest in the more scattered sections of Queens and Richmond. It is doubtful whether the smaller registration in the outlying boroughs is as complete as in Manhattan. There are seventeen tuberculosis clinics in the Borough of Manhattan alone, and it has often been noticed that a larger registration is found where there are more medical facilities and public health work. It is interesting to note that while the mortality from pulmonary tuberculosis in this borough in 1921 was 110, the registration on a given day averaged 644 living cases per each 100,000 population. —*Twelve Hundred Lives Saved from Tuberculosis in 1921 in New York City, Bull. New York Tuberculosis Association, January-February, 1922, iii, 1.*

Tracheobronchial Node Tuberculosis.—Pulmonary tuberculosis in early childhood is characterized by involvement of the regional lymph nodes, is indiscriminately distributed in the lung and usually heals by calcification. Dissemination of tubercle bacilli to other organs occurs less frequently than in adults. Ghon's view that in children the primary focus is pulmonary and the secondary focus lymphatic is cited. Krause, however, found that, in inoculating guinea pigs, the tracheobronchial nodes may show definite tuberculosis without evidence of disease in the lungs. Opie's work, on the pathological differentiation of the focal tuberculosis of children and the apical tuberculosis of late childhood and adult life, is reviewed at some length. Apical tuberculosis in adults is not the result of juvenile tuberculosis but is caused by a subsequent infection, since it is more common in later life when focal lesions are usually healed. The common symptoms of tracheobronchial involvement are those of the general toxemia of tuberculosis, and substernal pain that is increased by exercise or deep breathing. Enlarged tracheobronchial nodes may cause expiratory stridor. Cough is paroxysmal and brassy. Neighboring structures may be eroded by the pressure of enlarged nodes. The positive physical signs may include undernutrition, pallor, dilated veins over the anterior thorax, tuberculin reaction, unequal apical expansion, de la Camp's sign, tenderness over the manubrium, tenderness over the upper thoracic spines (Petruschky's sign) and a venous hum audible over the upper part of the sternum (Eustice Smith sign). The D'Espine sign is the most important auscultatory phenomenon. In 50 per cent of the cases there is whispered bronchophony over the thoracic vertebrae.—*The Significance of Tracheobronchial Node Tuberculosis and Its Diagnosis, L. Frischman, N. York M. J., December 7, 1921, cxiv, 634.*

Bilateral Pneumothorax in Pulmonary Tuberculosis.—Bilateral pneumothorax is extremely rare. The pneumothoraces in this case were not complete, but fairly large, as shown by the radiograph. They were not confined to the apices, but extended well down the chest cavities, and there was marked dyspnea and heart displacement. The patient lived more than two months after the second pneumothorax was found. The lungs at autopsy were noncrepitant, with the exception of a small portion of the middle lobe of the right lung. The progress of the case showed that a pneumothorax first appeared on the left side, pushing the heart over to the right. Later this partially disappeared, the heart coming back to the left. Then a right pneumothorax was found. X-ray proved that a double pneumothorax was present. The extensive adhesion of the lungs to the diaphragm and chest wall and the solid condition of the lung were probably factors in the causation of the pneumothorax. The intense dyspnea and the effort of the patient to secure sufficient air for respiratory need probably aided in the causation of the second pneumothorax. The locations of the tears in the pleurae were not found. It is striking that tubercle bacilli were not found. The lungs were so solid that slices of them resembled slices of egg plant.—*Bilateral Pneumothorax in a Case of Pulmonary Tuberculosis, D. Kremers, J. F. Hammond and R. E. Scott. Milit. Surg., December, 1921, xlix, 626.*

Tuberculosis and the War.—Vital statistics are now available in several countries showing the course of tuberculosis before, during and after the war. In most instances, to a greater or less extent, it is the same history of a rise of tuberculosis as war raged and a fall after its close, with the reduction varying according to the degree of reëstablishment of normal life. In the appended table tuberculosis mortality data have been gathered for the more important cities of Europe. Figures for New York City and the United States registration area have been added, in order to show the difference where war disturbances were not so marked.

Before the war, the lowest tuberculosis mortality in large communities was in London. Among the civilian population there, in the midwar year of 1917, the death rate rose by 31 per cent, quickly falling, in 1920, to a lower level than in 1913. The highest rate known before the war was in Cracow, Poland; and in the midwar year of 1917 it had almost doubled, rising 87 per cent. In New York City, the only influence was one of retardation upon the already fast-falling rate of the American metropolis. In Vienna the point of interest has been not only the increase of the disease but the maintenance of the dangerous tuberculosis situation, even in 1920. Paris, noted for its high rate before the war, seems to have held its own, though the 1920 rate was lower than the pre-war rate and an imminent reduction was simply delayed by the war. Perhaps, indirectly, the non-rise of the tuberculosis level in that city may be attributed to the art and resourcefulness of the French feeding method.—*Tuberculosis and the War, G. J. Drolet, Bulletin New York Tuberculosis Association, January–February, 1922, iii, 7.*

Death rate (a) from tuberculosis in large European cities, and in the United States and England before, during and after the war

(per each 100,000 inhabitants, period 1913–1920)

	YEAR								PRE-WAR 1913	MID-WAR, 1917	AFTER WAR, 1920
	1913	1914	1915	1916	1917	1918	1919	1920			
New York (Pulm. tbc.)	171	173	169	159	164	160	132	109	171	164	109
London (Pulm. tbc.)	130	139	160*	153*	171*	159*	117	106	130	171	106
Paris (Pulm. tbc.)	328	328	319	307	295	248	248	227	328	295	227
Berlin (Pulm. tbc.)	156			194	292	276	245	148	156	292	148
Vienna (All tbc.)	302	278	322	357	425	427	490	405	302	425	405
Warsaw (All tbc.)	306	312	410	601	840	592		338	306	840	338
Lodz (All tbc.)					1164	775	604			1164	
Cracow (All tbc.)	487	473	480	750	908	845	616		487	908	
Lwov (All tbc.)	480	586	741	622	665	635			480	665	
U. S. Regist'n Area (Pulm.)	128	128	128	124	129	133	111	100	128	129	100
England and Wales (Pulm.)	99	102	116*	118*	125*	134*	100	89	99	134	89

(a) Compiled by G. J. Drolet, Statistician, N. Y. Tuberculosis Association, from Bulletins of the "Statistique Municipale de Paris;" International Journal of Public Health; Annual Reports of the Medical Officer, London County Council; Bulletin, League of Red Cross Societies; U. S. Mortality Statistics, and Report of Registrant General of England and Wales.

* Civilian death rate only.

Pneumothorax Gases.—The findings of previous authors (Tobiesen, and Tachau and Thilenius) are corroborated in that pneumothorax gases contain 6 per cent carbon dioxide and 4 per cent oxygen. The statements, however, that in exudate cases the carbon dioxide attains over 10 per cent and oxygen goes below 1 per cent is not concurred with in cases with small exudates and in those arising from operative irritation. In these cases the figures approximate those in dry pneumothorax. In initial pneumothoraces the immediate carbon dioxide content of 1.88 per cent becomes in five minutes 2.80 per cent, and in 10 minutes 3.63 per cent. The outflow of carbon dioxide into the pneumothorax gas occurs rapidly at first and subsequently more slowly. Carbon dioxide determinations, after the injection of carbon dioxide-free gases as a means of measuring the volume of the pneumothorax space, have certain pitfalls and must be done in at least 2 interval readings.—*Untersuchungen über Pneumothoraxgase, H. Grass, Beitr. z. Klin. d. Tuberk., October 23, 1920, xlvi, 46.*

Myocarditis in Tuberculosis.—Two kinds of myocarditis occur in the course of tuberculosis: one variety, bacillary myocarditis, from which guinea pigs can be infected, is scarcely ever seen except in the course of acute exacerbations; also, with rare exceptions, it escapes clinical notice and is manifest at autopsy only through a modification in the tonicity and the color of the heart

muscle. This myocarditis is localized exclusively in the cardiac fibres and has little tendency to pass to the external surface of the myocardium. Sometimes it is associated with a thickening of the endocardium which takes on a whitish color, but this lesion is frequent and not specific. The second form of myocarditis is the result of healed tuberculous infection which has left behind it cicatricial foci, consisting of sclerotic nodules and more or less rarefied adult and embryonal muscle fibres, lesions which produce arrhythmic syndromes. In such lesions of the heart as in other organs, particularly the kidney, the cicatricial tissue does not always enclose active bacilli, as is shown by negative effects of inoculation. The cardiac syndromes accompanying these types of myocarditis depend on the general tuberculous state in addition to a more or less disseminated sclerosis leading to various arythmias. In these cases the name tuberculous myocarditis may be misleading, since repeated examinations never disclose either tubercles or giant cells. They ought perhaps rather to be called diffuse myocarditis of tuberculous origin, resulting from microscopic foci which interfere with the integrity of the cardiac fibre.—*Myocardites tuberculeuses et myocardites bacillaires, E. Lenoble, Rev. d. l. Tuberc., August, 1921, ii, 270.*

Differentiation of Hemorrhagic Osteomyelitis from Joint Tuberculosis.—Hemorrhagic osteomyelitis is not very frequent; but because of its predilection for spongy bone it may be mistaken for tuberculosis of a joint. Pathologically, the condition appears as a cavity in the spongy part of a long bone, lined with a brownish red membrane and filled with a hemorrhagic, jelly-like mass. The swelling is of regular shape and smoooth surface. Clinically, the lesion must be differentiated from sarcoma and tuberculosis. All three conditions occur in young patients. The location is the same in tuberculosis and may be the the same in sarcoma. There may be a history of trauma in all three. Early and severe pain distinguish tuberculosis and sarcoma from hemorrhagic osteomyelitis where pain is not marked. Limitation of movement may be noted in all three; likewise, muscle spasm. In osteomyelitis there may be no bony enlargement until the lesion expands; in tuberculosis the swelling is diffuse and involves the soft parts; in sarcoma it may be circumscribed, but is irregular. The tuberculous joint is hot; the other two conditions show redness and heat only when the skin becomes involved. Tuberculosis and sarcoma are progressive; hemorrhagic osteomyelitis may be stationary for years. Atrophy of adjacent soft parts, above and below the lesion, is present in tuberculosis and sarcoma; it is absent in hemorrhagic osteomyelitis except where long disuse has brought it about. No fever or general marasmus is noticed in hemorrhagic osteomyelitis. In this condition the X-ray shows a regular, sharply outlined cavity, without bone proliferation. The cortica, unless broken by violence, is intact; if broken, no bony tumor mass is shown outside the cortica. Tuberculosis presents no cavity; sarcoma not one of such regular shape and smooth outline. Sarcoma involves the cortica, breaks through it and usually shows a bony mass outside of it.—*Hemorrhagic Osteomyelitis, E. H. Arnold, Boston M. and S. J., December 15, 1921, clxxxv, 717.*

Tuberculous Peritonitis.—Tuberculous peritonitis as an insidious disease, chronic in nature, and often associated with tuberculous pleuritis, is well known to pediatricians. When not complicated by intestinal or pulmonary involvement, it may be combated by relatively simple means. The measures are chiefly hygienic. Complete repose is essential, best supplemented by immobilization of the abdomen, by the use of a moderately tight bandage, or even by a plaster cast. Radiation of the abdomen and lower extremities by X-rays has been successful, but is inferior to heliotherapy. With a beginning exposure to the sun for ten to fifteen minutes and increasing exposure on succeeding days, a marked pigmentation is achieved, which is simultaneous with absorption of the fluid. Paracentesis, even in the ascitic form, should not be resorted to, except when the process is complicated with suppuration, or serious compression occurs. Fresh air is important, with substantial but not superalimentation. Sodium arseniate, calcium phosphate and carbonate, lecithin, phytin and codliver oil are recommended. Apparent cure may be achieved in three or four months, but treatment should be continued two to three years.—*Péritonite tuberculeuse, J. Gomby, Presse Méd., October 15, 1921, no. 83, 1511.*

Tuberculous Rheumatism.—This condition, to which Poncet first called attention, manifested itself in this case as an acute polyarticular rheumatism (including the joints of the spinal column), with a subsequent subacute and milder course in an active pulmonary tuberculosis patient. The temperature remained relatively low, with an occasional involvement of some joint or other. In trying to pronounce it of tuber-

culous etiology (due to the toxins of the tubercle bacillus), it was found that the disorder did not submit to antirheumatic therapy (salicylates), that there were no endocarditic disturbances noticeable, and that with improvement in the chest condition, that of the joints also occurred.—*Ein Fall von tuberkulösen Gelenkrheumatismus (Poncet), G. Michels, Ztschr. f. Tuberk., February, 1921, xxxiii, 279.*

Suboccipital Pott's Disease.—The frequency of the location of spinal tuberculosis is in the following order: first, dorsal spine; second, lumbar spine; third, cervical spine. In the last region the parts least frequently affected are the first and second cervical vertebrae; hence Pott's disease involving these segments is comparatively rare. More attention is given to the condition in the French than in the English literature. The odontoid process and body of the axis and the lateral masses of the atlas, being of spongy character, are the most likely locations for the tuberculous process in these two vertebrae; it may extend to the anterior arch of the atlas and to the condyles of the occiput. Various luxations, determined by the amount of bone destruction, lead to deformities and secondary nerve pressure symptoms. Confusing syndromes may ensue; for instance, where the occiput settles down, following destruction of the lateral mass of the atlas and allowing the odontoid process to penetrate the foramen magnum. The disease is more common in children than in adults. The patient seeks aid for pain, especially on motion, high up in the posterior part of the neck. A typical picture of torticollis with pain is seen. Motion of the head is voluntarily limited and the chin may be supported by the hands. The onset and course may be rapid. Prevertebral or paravertebral abscess may form and travel down the cervical fascia, even as far as the lumbar region, before it points to the surface. It must be differentiated from atypical mastoiditis and pressure on the lower brain or lower cranial nerves. In the case reported, there was a destructive process in the right lateral mass of the atlas, revealed by roentgen examination. The usual roentgen technique is to expose through the open mouth upon a plate placed at the back of the neck but, in some cases, it may be necessary to try the transnasal method.—*Suboccipital Pott's Disease, C. M. Richards, Am. J. Roentgenol., 1921, viii, 632.*

Autonomic Nervous System and Blood Picture in Surgical Tuberculosis.—Fifteen cases of surgical tuberculosis were tested experimentally, 3 being females, the remainder males. Seven were under 20 years of age (10–20). In order to determine the state of the autonomic nervous system three procedures were inaugurated at intervals sufficiently far apart, so that the effects of one drug did not pass over into the next period. 1. Adrenalin was injected subcutaneously at 9:00 A.M., in a dose of 0.75 to 1.0 mgm. (less in children). Aschner's reflex was tested before and after injection, the pulse curve being recorded sphygmographically. From the time of injection the blood pressure and blood pressure curve were taken at five minute intervals. 2. Adrenalin was injected a second time in the same quantity. The total urinary output of the preceding day was measured and examined for the presence of sugar. Likewise, pulse, respiration, temperature, and dermatographia were determined. 3. At the third test-period, 7.5 to 10 mgm. of pilocarpin were injected subcutaneously at 9:00 A.M., and the same routine of blood examination and respiration were made. Besides, an increase in salivation and perspiration were noted. Adrenalin injections produced, at times, a marked leucocytosis, attaining its height about 20–25 minutes after injection. In this rise, the neutrophiles partake about equally with the lymphocytes. After the second injection of adrenalin, the lymphocytes decrease while the neutrophiles continue to increase. Less constant is the increase in eosinophiles, which after a lapse of two hours often drop below the normal. The mononuclear leucocytes behave similarly to the lymphocytes. Pilocarpin produced a less constant change in the blood picture. There is here also a tendency to leucocytosis. However, the rise occurs sooner and drops back to normal in shorter time. The differential increase is not consistent. From these data it would seem that tuberculosis of the more advanced form produces an upset in the sensitivity of the vegetative nervous system.—*Vegetatives Nervensystem und Blutbild, speziell bei der chirurgischen Tuberkulose, F. Breuer, Deutsch. Ztschr. f. Chir., July, 1921, clxiv, 225.*

Tuberculoma of the Spinal Cord.—A patient, twenty-nine years old, single, a clerk, complained of frequency, pain on micturition, diarrhoea and weakness in the legs which was increasing. For twelve months previously he had been treated for pulmonary tuberculosis, the diagnosis of which had been established by the finding of tubercle bacilli, and had gained 24 pounds. On examination it was noted that his gait was definitely purposeful. Other movements, such as rising from a chair, were

obviously studied. No objective symptoms referable to the upper part of the body were demonstrable. His mental condition was perfectly clear. There was marked exaggeration of the left knee jerk, slight left patellar colonus, slight left ankle clonus, great spasticity of the adductor muscles on both sides, and marked spasticity of the right lower extremity with exaggeration of all reflexes. The gravity of the motor symptoms increased with rapidity, the patient losing control of his legs almost entirely, six months after the examination. There was at this time also paralysis of both bladder and bowel with retention. Although Wassermann and colloidal gold tests on the spinal fluid were negative for syphilis, antisyphilitic treatment was instituted, with no other result than to disclose a marked intolerance for mercury. A diagnosis of myelitis, perhaps secondary to his prostatic abscess, was made, with the possibility of pressure on the cord from a tuberculous exudate or a tuberculous granuloma. Operation revealed a sharply circumscribed tumor at the level of the 5th thoracic segment, 2 cm. long, 4 mm. wide, and ¾ mm. thick, within the cord. It was shelled out by blunt dissection. Microscopic examination showed it to be tuberculous. Slight improvement in the patient's condition ensued, but bowel and bladder paralysis remained the same and the patient died four and one-half months later. No autopsy report is given.—*A Case of Tuberculoma of the Spinal Cord, J. J. Waring, J. Lab. & Clin. Med., November, 1921, vii, 96.*

Tuberculosis of the Spinal Cord.—A case of tuberculosis of the spinal cord is reported in clinical and pathological detail. The patient had pulmonary tuberculosis of a miliary type originating from the bronchial nodes, followed by a fibrinous pleuritis. A spinal meningitis developed; but before clinical symptoms of this were descernible a tuberculosis of the spinal cord arose, in the form of a myelitis involving the posterior roots of the cord; and only late in the disease a tuberculous basal meningitis, subsequently involving the entire meninges, occurred, which occasioned death. Of interest is the ascending nature of the spinal meningitis. Its greatest development was in the dorsal region, with marked swelling of the vascular walls and caseous edematous masses in the distended arachnoid space. In the roots there were perivascular inflammatory nodules, indicating that the process extended along the vessels. Clinically, the disease of the spinal column seemed to be primary and the meningeal involvement secondary, followed by the cerebral meningitis.—*Beitrag zur Klinik und pathologischen Anatomie der Tuberkulose des Rückenmarks, O. Ziegler, Beitr. z. Klin. d. Tuberk., October 23, 1920, xlvi, 73.*

Changes in Electric Nervous Excitability of Tuberculous Children.—The galvanic irritability of the nerves of fifty-two children with moderate and severe bone tuberculosis, partly associated with scrofulosis, was tested. Manifest evidence of spasmophilia was not present. In a high percentage the electric response deviated from the normal, but the findings were not wholly analogous to those in spasmophilia. Commonly, the galvanic tests revealed the anode closing irritability greater or equal to the kathode closing. Oppenheim stated in 1902 that in tuberculosis the mechanical irritability of the nerves was increased. It is believed that there is a relation between the exudative diathesis and tuberculosis in children.—*Über Veränderungen der elektrischen Erregbarkeit bei Kindertuberkulose, A. Wolff-Eisner, Beitr. z. Klin. d. Tuberk., November 25, 1920, xlv, 283.*

Clinical and Histological Features of Cutaneous Tuberculosis.—Of the various forms of disseminated tuberculosis of the skin, the clinical and histopathological features of two different types are recapitulated: lupus miliaris disseminatus faciei and the papulonecrotic tuberculides. In dermatological literature the two affections are not infrequently confused, though they represent entirely different clinical and histopathological entities. While the pathogenesis of lupus miliaris disseminatus faciei is probably identical with that of other forms of lupus, there is still much to be learned with regard to the pathogenesis of the papulonecrotic tuberculides. It is justifiable to assume that both affections are of tuberculobacillary nature. Until 1910, Loewenberg found only 30 cases of lupus miliaris disseminarus faciei in the literature. Up to 1914, Lewandowsky found records of 14 additional cases. Not a few instances of the eruption have been reported under the erroneous heading of acnitis, a variety of papulonecrotic tuberculides; so that the incidence of the disease is probably higher than these figures indicate. Several authors mention instances in which the skin of the face exhibits, beside the typical smooth, shiny, yellowish papules, deep-seated nodules, like those found in cases of acnitis; hence, there is to be considered the possibility of a transition from one disease to the other, or a combination of both. But in the typical eruptions, the individual papules are readily recognizable as small lupus formations,

presenting a more or less definite apple jelly tint, with sharply defined edges, and of soft consistence.—*Clinical and Histologic Features of Certain Types of Cutaneous Tuberculosis, F. Wise and D. S. Satenstein, Arch. Dermatol. & Syphilol., November, 1921, iv, 586.*

Skin Tuberculosis and Visceral Manifestations.—The question of the relationship of cutaneous to visceral and other forms of tuberculosis is highly speculative. The simplest form of skin tuberculosis in secondary infection of the skin from primary visceral disease is seen in invasion of the cuticle by underlying disease of lymph nodes, bones and joints, with the production of scrofuloderma or true lupus vulgaris. In the other forms of secondary skin infection there is a gap between the original forms and the skin, bridged by the tubercle bacillus. Autoinoculation of the skin from the sputum with resulting lesion of the type of verruca necrogenica is not uncommon. Very rarely, the formation of acute miliary tuberculosis of the skin, in the neighborhood of the mucous orifices, is observed, the infection being conveyed by discharges. Disseminated lupus after measles or other exanthemata, where it is supposed that tubercle bacilli have been conveyed by the blood stream to the skin from a disturbed visceral focus, occur. Another form is that of the tuberculides. In cases of primary tuberculosis, with secondary infection of the viscera, the family history is significant. Lancashire found a tuberculous family history in 23 per cent of all cases of lupus. Skin cases furnish about 2 per cent of all cases of tuberculosis, according to Osborne. A series of 72 lupus cases, taken about the year 1913, showed by 1921 visceral manifestations in 11 per cent, with a fatal issue in 4 or 5 per cent. A large proportion of lupus cases were found to yield bovine bacilli. The conclusions are reached that, whereas the causal relationship of primary visceral with secondary cutaneous tuberculosis is already established, the contrary causal relationship is not yet definitely proved. Probably infection of the viscera from the skin does occasionally occur, but the majority of cases of cutaneous tuberculosis in this respect remain well.—*The Association of Skin Tuberculosis with Visceral and Other Tuberculous Manifestations, G. H. Lancashire, Brit. M. J., October 8, 1921, no. 3171, 551.*

Erythema Nodosum, its Nature and Significance.—This paper discusses the relation of erythema nodosum to tuberculosis and offers much experimental evidence intended to prove the existence of such a relationship. The material consisted of 86 children with erythema nodosum observed in a hospital in Stockholm, plus a number of cases from private practice, which brought the total up to "almost 100 cases." All of these cases, with one exception, gave positive tuberculin reactions. In the latter, although two Pirquets were negative, the X-ray suggested hilum tuberculosis very strongly. The chief symptoms consist of indefinite general symptoms (such as languor, malaise, pallor and pains in the extremities), the typical eruption and fever. To these must be added, not infrequently, signs and symptoms pertaining to the lungs—cough, roughened breath sounds, prolonged expiration, râles, and transient impairment of the percussion note over certain areas. In 39 cases, chest X-rays were taken, of which 6 showed marked changes, easily recognized on physical examination, 29 slighter but definitely pathological processes, and only 4 no abnormality. Regarding the 4 cases with negative X-ray, 1 had a phlyctenular keratitis coincident with the erythema nodosum, 1 developed this eye condition four months later, and the other 2 had tuberculous cervical lymph nodes at the time of the eruption. Tubercle bacilli were not found in sections of the erythema nodules, nor by guinea pig inoculation, but the histological appearance is strikingly similar to the infiltrations produced by injections of tuberculin. In fact, Ernberg believes that erythema nodosum is an anaphylactic symptom complex and represents "an autogenous tuberculin reaction." Erythema nodules are very similar to positive tuberculin reactions, macroscopically and microscopically; there is a similar temperature course; both may produce focal reactions in the lungs; and both may cause a dissemination of the tuberculous process. In 11 cases, after the disease had apparently run its course, subcutaneous injections of tuberculin caused a return of the eruption, 5 times after one injection (one to four days later) and 6 times after two to three injections.—*Das Erythema Nodosum, seine Natur und seine Bedeutung, H. Ernberg, Jahrb. f. Kinderhk., 1921, xcv, 1.*

Erythema Nodosum of Tuberculous Origin.—Clinical evidence of the tuberculous nature of certain of these erythemas is abundant. Anatomopathological evidence is rare; the nodules, taken from living subjects, present as a rule only lesions of an ordinary inflammatory type. Most workers have found in the lesions neither follicles nor giant cells, but this is not to be construed as evidence against their bacillary origin,

since many nonfollicular lesions are capable of producing tuberculosis. The biological evidence is more conclusive. In cases where the clinical evidence points to a tuberculosis the agglutinin reaction was strongly positive in a great majority of those tested. The tuberculin reaction is almost constantly positive; injections of tuberculin for diagnosis may give rise to a nodule identical with already existing nodules or, in larger amounts, tuberculin may produce a recurrence of the disorder, in the form of nodules and febrile and joint symptoms, when it is injected into the skin of subjects previously afflicted with erythema nodosum. In these cases the nodules are of the characteristic type, and differ from the nodules which may be produced by injection of other substances. Bacteriological research has given some positive evidence. Leaving out, as uncertain, results obtained by the antiformin method, a number of findings not open to doubt have been obtained. In four cases where the blood has been injected into guinea pigs typical lesions with tubercle bacilli have been produced. Direct examination of the nodule taken from a living subject has revealed the presence of typical tubercle bacilli, and simultaneous injection of fragments of the nodule into a guinea pig has been followed by tuberculous lesions containing bacilli. The tuberculous nature of certain nodular erythemas may be considered as established without regarding all these erythemas as tuberculous. Dermopathic reactions of the same clinical type may result from different infections and intoxications. They have been described as occurring in septicemias of different origins, in malaria, syphilis, infections with worms, and as a result of different poisons, such as potassium iodide, copaiba and cubeb. What proportion should be assigned to tuberculosis among the causes of nodular erythemas? The clinical evidence points to a very large fraction. The bacteriological findings seem at first sight not to support the clinical evidence, but in this connection it should be remembered that in lupus inoculation is often, and in the tuberculides nearly always, negative. Landouzy's rule concerning sciatica may, therefore, be applied to patients with erythema nodosum: "We should suspect tuberculosis in every case of erythema nodosum which cannot be explained by a known infection or an evident intoxication." Where does this disorder belong in the dermatopathies of tuberculous origin? Apparently with Bazin's indurated erythema which it resembles through its eruptive lesions, but from which it differs by reason of its far more acute evolution, which is the most rapid of any bacillary lesion, visceral or otherwise, since in eight or ten days from its appearance it has run its entire course. The reason for this rapid evolution remains entirely a matter of speculation.—*L'erythème nodeux bacillo-tuberculeux, L. Laederich and C. Richet, fils, Rev. d. l. Tuberc., August, 1920, i, 229.*

Statistical Study of Renal Tuberculosis.—Among the patients of the Osaka Medical College during the past three years there were 16 cases of kidney tuberculosis in 24,000. The majority were of middle age and the proportion was male 9 to female 7. The proportion of right to left kidney was 12 to 4. All had pulmonary tuberculosis, indicating a hematogenous infection. The urine was slightly increased and fluorescent, but showed no change in specific gravity or odor. Hyaline casts were present in 12 per cent. Neither epithelial cells nor mucus were demonstrable, but pus cells were present and tubercle bacilli were found in 37 per cent.—*A Statistical Study of Tuberculosis in the Kidneys, Kozawa and Hiruma (Iji Shimbun, January, 1921), Japan Med. World, May 15, 1921, i, no. 1, 17.*

Renal Tuberculosis.—In order to determine two points, why tuberculous infection occurs more often in the right kidney and whether external injury plays a part in the causation of kidney tuberculosis, experiments were performed on rabbits. After injecting tubercle bacilli into the marginal ear vein, tuberculous foci were most numerous in the lungs, the kidneys being next, while the liver and spleen were rarely affected. Foci occurred in both right and left kidneys. The following clinical statistics were obtained: Of 105 cases of kidney tuberculosis, 58 were in males (55.2 per cent) and 47 (45.7 per cent) in females. Kidney tuberculosis seems to be more frequent between the ages of twenty and fifty years. The more frequent clinical involvement of the right kidney is believed to be due to the greater ease in diagnosing this condition, on account of its location as compared with the left. Injury does not seem to play a significant part in the development of kidney tuberculosis.—*Clinical and Experimental Study on Tuberculosis of the Kidneys, H. Komoda (Iji Shimbun, January, 1921), Japan Med. World. May 15, 1921, i, no. 1, 17.*

Chronic Tuberculosis of the Kidney.—In going over a series of more than 100 cases it was found that nine to twelve months elapsed from the beginning of the typical symptom complex until the real condition was definitely diagnosed. Chronic renal tuberculosis is most common between the

twentieth and the fortieth years. Males have slightly outnumbered females. In this regard American data vary from the European. Wildbolz finds that males are less frequently affected than females in the ratio 1:2. Of the cases that come to operation, the right kidney is more often involved than the left. Ten per cent of cases come to Beer when both kidneys are involved, and at a stage when no radical procedures are justifiable. Practically all cases are hematogenous in origin; very rarely the involvement is ascending. In the majority of cases the first manifestation of the disease is in one of the papillae of the kidney and extends towards the calices, the pelvis, the ureter and the bladder, with subsequent formation of ulcers. Thickenings form in the walls of these organs, and, not infrequently, stricture formation, with obstruction to the outlet of the kidney secretion. If secondary infection is superadded, all the changes associated with acute or chronic pyelonephritis are added to the picture of renal tuberculosis; occasionally, even calculi complicate the picture. Destruction and pathological repair appear to be going on side by side, though the destructive processes regularly gain the upper hand. A careful search of the history will present almost always a rather uniform picture of shorter or longer duration, which is so clear cut as to be almost diagnostic. The striking symptoms of the typical cases are frequency and urgency of urination, pyuria, albuminuria, hematuria and pain in the lumbar region. These symptoms usually develop insidiously, and gradually increase in severity. From Beer's experience there is no doubt that in the majority of cases of pyuria due to tuberculosis, the tubercle bacilli can be found if careful and repeated search of the properly stained sediment is made. Beer found them in 70 per cent of his cases. A sterile pyuria with acid urine is common in renal tuberculosis, whereas in all other conditions, except in nephrolithiasis, it is rarely seen. The cystoscopist must be called upon to rule out prostatatic tuberculosis, to diagnose the exact condition of the diseased kidney, and to determine that the second organ is not tuberculous. It is generally thought that the urine laden with bacilli infects the mucosa of the bladder and produces ulcerations which lead to exudation. This is highly doubtful. There is more likely a lymphatic submucous involvement with production of tubercles; and these gradually break down into ulcers. Before advising nephrectomy, a thorough examination of the patient is essential. Patients with pulmonary tuberculosis should be operated under gas-oxygen. In about 10 per cent the disease of the ureter has been producing extensive strictures; in these aseptic nephroureterectomy was performed. The mortality in a series of 100 cases was 2 per cent. After the removal of the kidney in unilateral involvement the patient is not cured. His general hygiene must be supervised and his resistance built up. Sinuses form in about 10 per cent of cases in the lumbar wound. Of patients operated upon, about 60 per cent are completely cured, 80 per cent recover, and 20 per cent die within five years of the operation, according to Braasch's statistics.—*Chronic Tuberculosis of the Kidney, F. Beer, Amer. Jour. Med. Sci, November, 1921, clxii, 736.*

Genesis of Genital Tuberculosis in the Male.—Simmond's contention that male genital tuberculosis arises by hematogenous excretion of the bacilli into the lumen of the seminal vesicle, vas or convoluted tubules, and that from here they set up a catarrhal process, with desquamation and necrosis of the epithelium of the mucous membrane and formation of granulation tissue in the submucosa, is here disproved by bacteriological and histological study of cases. In the lumen of the tubules, tubercle bacilli could be detected only in the cases in which there was present also a tubercle in the wall of the tubule which had broken through into its lumen. Four such cases as this were found; 2 only in the epididymis, only 1 in the epididymis and testicle and in 1 in the testicle only. In the serial sections it was seen that hematogenous tuberculosis of the genital organs tends in its inception to locate in the blood vessels, and often erodes into their lumina. The vessels into which such rupture occurred were the left spermatic vein and the spermatic plexus.—*Zur Frage über die Genese der Tuberkulose des männlichen Genitales, L. Sussig, Deutsch. Ztschr. f. Chirurgie, March, 1921, clxv, 101.*

Renal Complications of Pulmonary Tuberculosis.—Two kinds of kidney complications are encountered in the course of pulmonary tuberculosis; specific and nonspecific. Of the former three types are described clinically and pathologically. They are (1) the kidney tubercle, (2) specific interstitial and glomerulonephritis, and (3) tuberculosis of the kidney. *The kidney tubercle*: The origin of the kidney tubercle is mostly in the glomerulus; in the capillary tuft the tubercle bacillus becomes enmeshed from the blood and tubercle originates in the capillary wall. This is especially manifest in its early stages. Generally, these tubercles do not disclose their presence clinically. It seems that the intermittent, mild, mostly

microscopic hematurias, appearing in chronic pulmonary tuberculosis cases, are to be referred to the kidney tubercle. *Specific interstitial and glomerulonephritis:* There are three forms: 1. That in which the pathological changes seen in sections are relatively slight and confined mainly to an interstitial infiltration which is mostly perivascular and along the efferent tubules. The changes in the glomeruli are slight and often affect only a few glomeruli. Clinically, these cases are characterized only by periodic microscopic hematurias and slight increase in white blood corpuscles without other nephritic symptoms. The diagnosis is often impossible during life. 2. Besides the more or less outspoken small cell infiltration in the medulla and cortex, there are also marked and widespread changes in the glomerulues. *Intra vitam* these cases are diagnosed as focal nephritis. Clinically, there is in these cases an outspoken hematuria. The sediment shows many red blood cells, blood, granular, and hyaline casts, and numerous leucocytes. The blood pressure is very low (80–90 mm.). Subjectively there is usually mild, sometimes severe, pain in the kidney region and dysuria. No tubercle bacilli are found. The entire picture resembles that of a typical glomerulonephritis. 3. A few cases with the signs of a chronic glomerulonephritis were studied, both clinically and pathologically. These forms of glomerulonephritis are caused specifically by the tubercle bacillus, though no tubercles were found in the kidney. *Tuberculosis of the kidney*: The incidence of this complication of pulmonary tuberculosis was only 1.6 per cent in 2500 cases. Most of the 40 positive cases studied were of the hematogenous variety with the kidney poles involved in most of them. It was characterized clinically by but few symptoms, and slight intermittent microscopic hematuria with an occasional heavy sediment of pus. Pathologically, these cases showed evident tuberculous foci in the kidneys frequently with cavitation. *Nonspecific renal changes:* Here are grouped types including all kinds of kidney changes: inflammatory, degenerative and sclerotic. These complications, however, are not due to the tubercle bacillus in most of the cases, but more to intercurrent conditions. Occasionally, the toxin of the bacillus seems to produce kidney injury. Of the inflammatory types there are (1) diffuse glomerulonephritis, and (2) focal glomerulonephritis. The degenerative types are (1) cloudy swelling of the kidney, and (2) genuine nephrosis with or without amyloid. Of the arteriosclerotic kidney lesions four cases were studied in which the typical sclerotic lesions in the vessel walls were seen; but in life no hypertension existed nor was there cardiac hypertrophy. This condition is ascribed to the depressor effect of the toxin of the tubercle bacillus, associated with the sclerotic kidney. It was found that in a study of 476 cases of pulmonary tuberculosis, in patients over 40 years of age, the average systolic blood pressure was 108 mm. Hg. In only 15 cases was the pressure 140–150 mm., and even in most of these the pressure dropped to a lower level. Only 8 cases showed the typical picture of a permanent hypertension. In these the systolic pressure was never over 200 mm., and most of the time was 150–180 mm. These were cases with a relatively benign, chronic, nonprogressive course. *Therapy:* When upon ureteral catheterization one kidney is found to be relatively free from tuberculosis and the pulmonary process not active, removal of the affected kidney is indicated. If the pulmonary process is advanced and progressive, the removal of the more diseased kidney is of no value, because the other kidney will soon become seriously involved, since, as a rule, due to hematogenous infection, this kidney is already more or less affected, or, due to the rapidly advancing pulmonary condition, the good kidney is almost certain to become involved. In such cases symptomatic treatment is indicated. Focal nephritis of tuberculous nature is very resistant to treatment. If the hematuria is marked, a salt-poor diet is advised, since excessive salt intake increases hematuria. Focal nephritis arising otherwise must be treated similarly, by occasional flushing of the kidney by drinking at one time 1500 cc. of weak tea. Diffuse glomerulonephritis, with cardiovasicular syndrome and edema, is best treated according to Volhard's method with starvation and deprivation of water, and occasional flushing of the kidneys as described above. The chronic form of focal nephritis with mild chronic hematuria requires no special treatment. Foci of infection in various parts of the body should be removed in all of these renal conditions. The heart must be carefully watched, and in case of threatening failure tincture of strophanthus should be injected intravenously. In threatening eclampsia the usual measures are instituted, such as lumbar puncture, bleeding, and so forth. When edema develops diuretics, especially large doses of urea, reduction of fluid intake and salt-free diet are indicated. If cardiac insufficiency is present in the hypertonic cases, a course of digipuratum is indicated (0.1 gm. three times daily for two days, 0.1 gm. twice daily for two days, 0.1 gm. once a day for two days) combined with

1.0 gm. diuretin three times a day. Later digitalis may be given in small doses.—*Zur Klinik und Pathologie der Nierenerkrankungen im Verlaufe der Lungentuberkulose, O. Kieffer, Ztschr. f. Tuberk., October, November, December, 1920, xxxiii, pp. 9, 65, and 137.*

Surgical Intervention in Renal Tuberculosis.—A case of kidney disease of obscure origin with retention of urine, due to hypertrophy of the urethra and bladder, is reported in which cystoscopic and ureteral sound examination failed. The case, presenting hematuria and frequent desire to micturate, was operated upon. Both kidneys were found tuberculous. Operation is recommended in similar cases of kidney trouble, provided the patient is in good condition and the real cause of trouble is not clearly known.—*On the Exposure of the Kidneys in the Case of Kidney Tuberculosis in Which neither Cystoscopic nor Ureteral Sound Examination is Applicable, S. Sugimura (Iji Shimbun, January, 1921), Japan Med. World, May 15, 1921, i, no. 1., 17.*

Subacute Miliary Tuberculosis with Hematemesis as Cause of Death.—A case is reported in which two rare conditions occurred, namely, a subacute miliary tuberculosis, and a breaking through of the tuberculous process from the spleen into the stomach, causing an erosion of one of the larger gastric arteries, and resulting in a large hematemesis (1 litre) with death the next day.—*Ein Fall von Tuberkulosis miliaris subacuta mit Haematemesis als Todesursache, E. Als, Ztschr. f. Tuberk., February, 1921, xxxiii, 231.*

Tuberculous Proliferation in the Tubal Mucous Membrane Resembling Adenoma.—A case is reported with pain in the left pelvis, especially after menstruation, ceasing after the emission of an ounce of a watery fluid. Pain also accompanied urination and defecation. Menstruation was of three day type and regular. No pregnancies. Palpation revealed enlarged adnexae and a tumor on the right side, the size of an egg. The histological report was papillary adenoma of the tubes. Some sections revealed pure adenomatous structures, and others a tuberculous process or a combination of the two. The tuberculous process was evidenced by caseation, epithelioid cells, and tubercles with giant cells. Adenomatous acini were found with connective tissue between them. The adenoma-like tumor evidently arose from the tuberculous inflamed tubal mucous membrane. The pains probably resulted from tubal contraction upon the tumor. Sterility is evident as a result of the pathological changes in the tubes. The diagnosis in this case was not easy, especially considering the absence of any other tuberculous focus, and since primary genital tuberculosis has not been shown to exist.—*Über Tuberkulose mit adenomaähnlicher Wucherung der Tubeschleimhaut, J. Frist, Arch. f. Gynaekol., 1921. cxiv, 393.*

Aspergillosis and Pulmonary Pseudotuberculosis.—Aspergillus is one of the hyphomycetes, among which reproduction is usually asexual, but the stability of aspergillus seems to be insured only by occasional sex conjugation. Aspergillus malgus often causes a persistent and painful otitis in man and aspergillus pictor is a cause of common chronic skin diseases in South America. Aspergillus fumigatus is a universally diffused organism and produces lesions resembling fibroid tuberculosis in man and animals. This pseudotuberculosis is often transmitted to man from pigeons and parrots, and is common in hair combers who use rye flour to remove grease from the hair. Histologically and clinically, it closely simulates tuberculosis, particularly if pulmonary tissue is involved. In the late stages tuberculosis may be a complication. The organism grows on all laboratory media, especially potato and bread. For study, the elements of Raulin's liquid medium are combined to make a solid medium of the following composition: water, 1500; saccharose, 70 gm.; tartaric acid, 4 gm.; ammonium nitrate, 4 gm.; ammonium phosphate, 0.6 gm.; potassium carbonate, 0.6 gm.; magnesium carbonate, 0.4 gm.; ammonium sulphate, 0.25 gm.; zinc sulphate, 0.07 gm.; iron sulphate, 0.07 gm.; potassium citrate, 0.07 gm.; agar-agar, 18 gm. After three days the colonies appear as white, stellate or round points that increase and become greenish and, in ten or twelve days, the culture has a smoky appearance. The mycelium appears as a dense velvety mass. In examining sputum for aspergillus fumigatus, the routine test for tubercle bacilli does not suffice. Thick portions of sputum should be treated with a ten per cent solution of sodium hydroxide for three minutes. Smears made from this are studied wet under the one-sixth objective, when the hyphae, mycelium and fructification heads are easily seen. Thin smears may be stained by Gram's method for finer study. If these findings are negative, cultural studies should be made, as spores may be present. Clinical symptoms may vary from those of an acute bronchopneumonia,

caused by the thermostable toxin of the organism, to those of chronic tuberculosis, with emaciation, fever, sweats, cough and hemoptyses. In early stages of the disease iodides are efficacious. Sodium or potassium iodide may be given by mouth, or sodium iodide, in doses of 1 or 2 grains in 25 cc. salt solution, intravenously. Hygienic care, rest and proper nourishment are essential. The infection often responds quickly to iodides, as shown by the records of five cases, but there may be recurrences. In one case a complicating tuberculosis improved markedly, following eradication of the aspergillus infection. In one relapsing case of aspergillosis, a saline extract of aspergillus culture was used with good results. Aspergillosis is not so rare as usually believed.—*Aspergillosis and Pulmonary Pseudotuberculosis, V. A. Lapenta, N. York M. J., December 7, 1921, cxiv, 629.*

Carcinoma of the Lung.—In the case reported, the prominent physical signs were cachexia, dyspnea, cyanosis, hoarseness, diminished expansion of the left chest, dulness at left apex and above the third rib anteriorly, and diminished breath and voice sounds over the entire left lung, without râles. There was a movable, painless nodule in the skin over the second right intercostal space and another in the left buttock. X-ray showed consolidation of the upper left lung, suggesting tuberculosis, except that it merged partly with a mediastinal density. An excised skin nodule showed alveolar carcinoma.—*Carcinoma of the Lung; Report of a Case, G. A. Friedman, Med. Rec., December 3, 1921, c, 980.*

Nature and Treatment of Tuberculosis on the Basis of War Experience.—Childhood infection can always, with proper causal factor, lead to a disease of chronic course (chronic phthisis). This infection protects against new infection, but menaces about 80 per cent of the civilized world with pulmonary tuberculosis. The enormous increase of the tuberculosis mortality during the war is to be attributed to an increase of the causative factors. People not infected in childhood and consequently not immunized (about 20 per cent of the population) receive during the course of life a first infection, and develop a malignant form, which rarely occurs in adults in time of peace, but more commonly during war on account of the increased opportunity for infection. A specific therapy has, theoretically considered, a greater prospect for producing results in children and nonimmune adults shortly after they become ill, than in sick adults that were infected and immunized in childhood. With sufficient care, the cause of illness in the majority of the chronic phthisis cases can be discovered in detail; its consideration makes possible a causal therapy. The present treatment of chronic phthisis, the so called hygienic-dietetic method, can only be viewed as a symptomatic therapy; the outgrowth of this method of treatment, for instance, overfeeding and milk diet, must be abolished.—*Wesen und Behandlung der Tuberkulose auf Grund der Kriegserfahrungen, Wolff, Beitr. z. Klin. d. Tuber., November 25, 1920, xlv, 253.*

Influence of Sea Air on Tuberculosis.—The elements of a climate are physical, chemical and bacteriological. As to its physical action a marine climate is characterized by very intense light, especially rich in rays of short wave lengths. Even in high altitudes "chemical" rays are not more abundant than at the sea; the barometric pressure is high; the winds are strong and variable; the temperature is variable; the humidity low and rather constant. Besides the chemical constituents which are fairly constant, for instance, oxygen, nitrogen and carbon dioxide, sea air contains unusual amounts of ozone, chlorine, bromine, iodine and silica. Bacteria are rare, owing in part to the destructive action of marine light. All of these factors have a biological importance and some of them may act either as sedative or as stimulating influences. Llght, changes of temperature, wind, chlorine and ozone act as stimulants. Moisture and uniform temperature are sedatives. A climate for phthisis should have thermal stability. The temperature in itself is not important, but abrupt changes of temperature produce exacerbations. Winds act unfavorably by cooling the body and stimulating oxidation to maintain the body temperature. Dry winds are most damaging, but moist winds are also harmful. Almost all phthisical persons have an increased respiratory exchange, dating from the beginning of their illness. Hence, a marine climate is contraindicated in all active tuberculosis, in subacute, acute and peracute evolutions, in beginning phthisis with fever which does not fall considerably in the morning, in advanced forms, cachectic forms, febrile forms, erethic forms, hemorrhagic forms, excitable forms, in phthisis, more or less advanced, where the temperature is not lowered by rest in bed, and in forms where the general state is worse than is shown by the lesions. Experiments with tuberculized guinea pigs demonstrated that those placed at the seashore died earlier than their controls kept at Paris in a room containing 1700 bacteria

to the cubic metre. But all patients are not stimulated by a marine climate. The respiratory exchange of some is not altered at the seaside. And where excitation occurs this may diminish spontaneously and disappear with acclimatization. Certain regions, owing to special conditions, are much more stable and mild, and hence less stimulating than other regions. About 8 per cent of persons with pulmonary tuberculosis have normal respiratory exchange. These, and patients in which the disease is slow with a tendency to heal, may benefit by a sea climate. Demineralization is the dominant feature of their illness. They resemble patients with external tuberculosis and are susceptible to the same therapeutic measures. Those with exaggerated respiratory exchange, who lack appetite, who digest or assimilate badly, may be benefited by sea air. They should remain only while improvement lasts. Even at the most favorable places, patients ought to avoid the immediate neighborhood of the sea, above all during storms, and they should protect themselves against wind and too intense light. The organic remineralization which results from the general improvement in nutrition brought about by a marine climate may always, in case of need, be reinforced by medication.—*Les tuberculeux pulmonaires à la mer, A. Robin and M. P. Weil, Rev. d. l. Tuberc., August, 1920, i, 209.*

Artificial Pneumothorax Statistics for 1912–1919.—During 1912–1919 a total of 243 cases were treated with artificial pneumothorax, of which 38 were children, 140 women and 65 men. During 1915–1919 systematic treatment was instituted in 18.9 per cent of women and 12.5 per cent of men. The average age was 24.9 years (range 6 to 56) for women, and 27.4 for men (range 16 to 57). The sides treated were 66 times on the right and 74 on the left in women, 33 times right and 32 left in men. Since no success in introducing air resulted in 12 the total statistics are based on 193 cases. The one-sided involvement occurred about equally right and left: men 33:32, and women 66:74. Results cannot easily be set down in figures, since statistics based merely on the number of cases benefited or harmed, with complications, etc., are worthless. The cases are therefore grouped in 5 classes which are more serviceable for statistical purposes: 1. Indications for pneumothorax absolute in cases in which conservative methods failed; (a) one side fibrous, including fibrocavernous forms; (b) one side chronic infiltrative processes. 2. Indications relative in forms under 1 with inactive limited foci on the other side. 3. Indications symptomatic in relatively chronic ulcerative pneumonic forms (Neumann's favorable cases of caseous phthisis). 4. *Indicatio vitalis* in case of life-endangering hemorrhages. 5. Contraindications in (a) acute, rapid infiltrative-ulcerative processes and (b) acute caseous pneumonia. The cases are further classified as (A) females and (B) males. In 140 females the indications absolute in 10, relative in 8, symptomatic in 120, and vital in 2. Summarizing classes 1 and 2: In no case did treatment make the condition worse, no activation occurred on the relatively healthy side, and no exudates formed; return to work was early. 3: Symptomatic results obtained: variable success, treatment had to be stopped on account of condition of opposite lung, intestinal tuberculosis, etc., exudates in 20 per cent, empyema in 12 per cent, and 2 influenza cases. 4: Two cases. Hemorrhages ceased but treatment had to be terminated on account of the condition of the other lung; exitus in 3 weeks and 9 months. In 65 men indications were absolute 7 times, symptomatic 57 and vital once. Summarized: 1: no complications, in 3 cases the patient was to blame for stopping treatment, and 2 of these then resulted unfavorably. 2: Serous effusion in 9 to 19 per cent, empyema in 4 to 8 per cent, clinical healing in 2 after one and a half and two years' treatment, 9 are still being treated, in 11 treatment was stopped on account of complications (process on other side aggravated, intestinal tuberculosis). By March, 1920, 20 had died, 14 (mostly soldiers) were lost track of and 13 were alive. Of the 13, 9 are still being treated and are working, 2 are seriously ill and 2 are well and working. In 7 that died the disease became worse after stopping treatment. 3: Hemorrhage ceased completely after 2 fillings in the 1 case. Of the total 193 cases, exudates occurred in 25 per cent, 92 died and 53 are still alive (outcome of 48 unknown), clinically healed 7 cases, capable of working 65 (34 per cent), still living and working, 33 cases. The impression gained is that pneumothorax, as a popular measure, can play only a minor part in combating tuberculosis, but in treatment it has a definite place.—*Statistik der künstlichen Pneumothoraxtherapie für die Jahre 1912–1919, Harms, Beitr. z. Klin. d. Tuberk. October 23, 1920, xlvi, 105.*

Artificial Pneumothorax Therapy.—Pneumothorax treatment is to be instituted only after all other methods have failed. It is to be looked upon as a last resort, since accidents and complications may arise. It is not advised when lesions extend

to the lower lobe in the vicinity of the hilum on the healthy side where activity and progression are readily initiated by abolishing the function of the other lung. Intestinal tuberculosis is also an absolute contraindication, but not laryngeal tuberculosis. The Schröder and Kaufmann (1912) modification of the Brauer method is recommended. Puncture in the second intercostal space is considered inadvisable, on account of the danger of injuring large vessels. Nitrogen is the gas of preference, but atmospheric air is also acceptable, the latter being absorbed more rapidly. When possible an attempt should be made to obtain immediately a total pneumothorax. If it is not certain that the canula is in the pleural space, carbon dioxide should be first introduced; according to the latest ideas it is rapidly absorbed by the blood. Postural differences influence the manometric pressure through the flexibility of the mediastinum and weight of the heart. The average duration of treatment is two years, although individualizing is essential. The earliest attempt to work should be only after 6 months.—*Zur Pneumothoraxbehandlung, G. Michels, Beitr. z. Klin. d. Tuberk., October 23, 1920, xlvi, 132.*

Artificial Pneumothorax.—During the years 1914–1920 there were 105 patients treated by artificial pneumothorax in the sanatorium at St. Blasien, and in 24 of these the treatment was unsuccessful because of extensive pleuritic adhesions, or the pneumothorax attained was so slight that it could have no influence upon the disease. The puncture method of Forlanini-Saugman was preferred to the incision method of Brauer and Spengler. The patient was given 0.03-0.05 codein to reduce the cough; the field of injection was sterilized and anesthetized with ethyl chloride; the needle inserted; the manometer read and 50–100 cc. oxygen given. If no untoward symptoms occurred and the manometer was still negative, nitrogen was injected to the extent of about 500 cc. for the first filling and not to exceed 600–800 cc. at subsequent fillings; only in cases of hemorrhage was this extended to 1000 cc. or more. The first refill was given in 3–8 days, and subsequently the intervals were increased to 8–14 days, and up to 4–5 weeks, dependent upon the nitrogen absorption. Of the 81 cases in which a satisfactory pneumothorax was obtained, 24 resulted without favorable influence; 57 (70 per cent) showed an immediate benefit; while in 30 per cent sputum and cough increased. In 80 per cent a small weight decrease occurred in the first 14 days; but in 75 per cent an average gain of 2.5 kg. occurred within 8 weeks (as compared to 0.2 kg. in the 24 unsuccessful pneumothorax cases). Before treatment all had bacilli in the sputum and 90 per cent had elastic fibres. In the 57 favorable cases the bacilli disappeared, on an average in 4–6 months, while elastic fibres could not be found after 2 months. Fever occurred in the evening of the day of initial pneumothorax, which in the favorable cases gave way to a normal temperature. Of the 81 successful pneumothoraces, 31 (38 per cent) developed exudate (in 1915 of 13, 3 = 23 per cent; in 1916 of 12, 2 = 17.5 per cent; in 1917 of 15, 6 = 40 per cent; in 1918 of 17, 8 or 47 per cent; and in 1919 of 24, 12 = 50 per cent); showing an increased incidence of exudate during the war years which is attributed to the poor nourishment, uncleanly conditions, worry, physical overtaxing, and the reduced resistance of the patients. Of 5 patients with artificial pneumothorax, 3 were unaffected by influenza, while 2 had pneumonia on the untreated side. One of these latter lost all previous benefit and the other suffered extension of the tuberculosis on the practically unaffected side. Contraindications to treatment were laryngeal tuberculosis with difficulty in swallowing or marked infiltration and edema; and severe intestinal tuberculosis; while febrile and toxic albuminurias (except parenchymatous nephritis), and the age of the patient were not contraindications. After 6 months, 34 (42 per cent) were definitely improved, 20 (24.5 per cent) improved, 8 (10 per cent) unchanged and 14 (18.5 per cent) worse. Thus, 66 per cent showed a favorable effect of pneumothorax, although later results, on account of the short period of observation, were impossible of determination.—*Unsere Erfahrungen über künstlichen Pneumothorax bei Lungentuberkulose, L. Rickmann, Beitr. z. Klin. d. Tuberk., October 23, 1920, xlvi, 28.*

Pneumothorax Treatment of Pleurisy.—The first case reported had a large effusion in the left chest that reaccumulated after repeated aspirations. Finally two quarts of fluid were withdrawn and oxygen was slowly injected by connecting the aspirating needle by a rubber tube to the oxygen tank. The injection was discontinued when the patient complained of distention and distress in the left chest. The patient then gradually recovered and the lung slowly expanded. The fluid was negative for tubercle bacilli, but showed contamination. The second case, treated twelve years ago, had a left, recurrent, tuberculous pleurisy. Fluid was aspirated and oxygen was forced into the pleural cavity. After ten days' temporary im-

provement, the patient was seized with intense pain and dyspnea, and died. Autopsy showed thrombosis of the left pulmonary artery and prostatic plexus, in addition to the tuberculous lesions. Oxygen injections should be tried in recurrent pleurisy, refractory pneumococcus empyema and probably in simple pleuritic effusions, where the fluid does not resorb after aspiration. Oxygen may have some counteracting effect on the pathological condition, by virtue of its chemical properties. Nitrogen is less rapidly absorbed by the tissues. More than twenty years ago Sir James Barr, of Liverpool, treated pleurisy with effusion by the injection of gas. No record of its use for this purpose in the United States has been found.—*Treatment of Recurrent Pleurisy by the Injection of Oxygen, A. MacFarlane, N. York M. J., December 7, 1921, cxiv, 623.*

Gas Emboli during Artificial Pneumothorax.—Only 2 deaths from gas embolism, which are reported in detail with postmortem findings, occurred during about ten years of pneumothorax therapy for pulmonary tuberculosis; in which time 171 initial and 1254 refills were performed. In both fatal cases death was due to gas or air emboli in the brain. Air bubbles were not found in the vessels of the brain at postmortem, but tissue changes were evident, the gas having been absorbed or passed along during the interval between the occurrence of embolism and death (about twenty-four hours). Both cases were right sided pneumothoraces and the brain emboli localized on the right side. One case had had a previous nonfatal embolism a year prior to exitus. A warning is given to heed previous symptoms of embolism by discontinuing artificial pneumothorax, although the source of the second embolism was in this case probably different from the first. Manometer readings indicated that the needle was in the free pleural space, and air was introduced to a positive pressure. It was difficult to determine the site of entrance of the gas into the blood. Auscultation, percussion, and roentgen findings all indicated a large free pleural space. The embolism only became evident clinically as the needle was being removed, when the gas under pressure followed the needle and was probably aspirated into a pierced vein along the needle track in adhesions to the thoracic wall. At postmortem this idea was substantiated in that the entire upper part of the lung was adherent to the chest wall, and the pleural gas had formed a dome of the pleural space. With increased gas pressure the upper and middle lobes were compressed upward and laterally, and the lower lobe downward and mesially. High intrapleural pressures are warned against, as favoring the development of gas emboli, especially in cases with marked upper lung adhesions and with destructive changes or conditions favoring a collapse from below. Radioscopy as a guide in these cases is valuable, in indicating the dome-like collapse, when every precaution should be taken to enter as low as possible to avoid passing through lung tissue. Repeated roentgen ray observations are advocated as a better means to this end. The dangers of embolism are not absolutely avoidable with our present diagnostic methods in spite of every precaution.—*Über Gasembolie bei künstlichen Pneumothorax, W. Siebert, Beitr. z. Klin. d. Tuberk., November, 25, 1920, xlv, 302.*

Artificial Pneumothorax and Exudative Pleuritis on Opposite Side.—According to Spengler 50 per cent of all pneumothorax cases have an effusion on the treated side but there has been reported in the literature only one case with effusion occurring on the opposite side. The case reported is one in which an exudative pleuritis occurred on the right side, which gradually disappeared without serious consequences in a patient who had had pneumothorax for the previous year on the left side with an effusion. The right lung was negative clinically and roentgenologically.—*Pneumothorax artificialis und Pleuritis exsudativa der Gegenseite, E. Süssdorf, Beitr. z. Klin. d. Tuberk., November 25, 1920, xlv, 298.*

Perforation of a Cavity in Artificial Pneumothorax.—A case is reported, in which fourteen days after the administration of pneumothorax and following a fit of coughing, there occurred a perforation associated with violent stabbing pains posteriorly at the base, elevation of temperature to 104°F., tachycardia, small pulse, and marked dyspnea. A turbid serous fluid was obtained by thoracentesis. At autopsy an opening, a few millimetres in size, with punched-out edge, was found leading into a cavity on the pneumothorax side.—*Über einen Fall von Spontanpneumothorax durch Durchbruch einer Kaverne in einen grossen artificiellen Pneumothorax, H. Maendl, Ztschr. f. Tuberk., June 20, 1920, xxxii, 162.*

Unavoidable Accidents of Artificial Pneumothorax Administration.—A case of sudden death during pneumothorax administration with postmortem findings is reported. Death occurred before the cock

to the gas reservoir was opened, and therefore could not be prevented by observation of the manometer. The postmortem did not prove whether the death was occasioned by air embolism or as a result of pleural shock, although the section was carefully performed by the usual methods of autopsy at which air usually enters the vascular system (and right heart). It is deplored that a more satisfactory autopsy method to elucidate this question has not been devised. Careful search for a vessel with opening where the needle may have entered proved of no avail. Although gas embolism is more common in pneumothorax than pleural shock, the available evidence does not point to the former and makes pleural shock seem the more probable solution in this case.—*Bisher unvermeidbare Gefahren der Pneumothorax-operation. Beitrag zur Frage: Schock oder Embolie? A. Wolff-Eisner, Beitr. z. Klin. d. Tuberk., November 25, 1920, xlv, 275.*

Artificial Pneumothorax Causing the Symptoms of Facial Neuralgia.—In a patient with pulmonary tuberculosis, each of 12 injections caused a facial neuralgia on the injected side. When the pneumothorax injections were abandoned, the neuralgia subsided and did not reappear. This is a novel instance of peripheral neuralgia induced by visceral excitation.—*Pneumothorax artificiel et neuralgie faciale, M. A. Ricaldoni, Presse Méd., June 1, 1921, xxix, 437.*

Spontaneous Pneumothorax Complicating Artificial Pneumothorax.—The number of cases of spontaneous pneumothorax complicating artificial pneumothorax that have been reported total only about 17 (Forlanini 8, Spengler 2, Keller 1, Horning 2, and Wallgren 4) and the reports on these are mainly descriptive. [*Editorial Note:* The author is apparently not familiar with American literature.] Eight cases are reported and discussed in detail. The characteristic findings were labored respiration attaining a severe dyspnoea, pain on the pneumothorax side, cyanosis, steep ascent in temperature with subsequent rapid drop, and weak and rapid pulse. Physical findings were mostly unchanged. The cardiac resistance and the size of the perforation determine whether a severe shock results or the patient recovers. Clinically, it is impossible to determine whether the perforation occurs in normal or diseased lung tissue, either being possible. If the perforation occurs in diseased lung tissue there follows shortly thereafter a pleural empyema or pyopneumothorax. If the perforation occurs into a cavity, its contents contaminate the pneumothorax with rapid exudate formation in the pleura. The exudate is rich in formed elements, being primarily of a leucocytic type and containing many endothelial cells. The leucocytes are well preserved. Tubercle bacilli are never absent. A definite mixed infection may soon develop. The protein content of the fluid is high. Spontaneous closure of a small lung perforation may occur. The treatment of a valvular pneumothorax with increasing pressure is essentially to relieve the pressure by removal of the gas, and support the heart action. If a pyopneumothorax has developed, the removal of the pus is advisable. In spite of removal of the pus after rib resection in two cases, only temporary results and a slight prolongation of life was obtained. In these cases of spontaneous pneumothorax, it is not merely the removal of the pus that is of greatest consequence; but the changed respiratory relations may be instrumental in occasioning complications leading to death. In inspiration, air is drawn into the healthy lung through the trachea and from the pneumothorax space through the perforation. The active lung, therefore, receives not alone fresh air but a mixture with pneumothorax air rich in CO_2. In expiration the CO_2 containing air not only leaves through the trachea but also goes into the pneumothorax space. This explains the dyspnea. The accepted methods of treatment have failed because the removal of the pus, with large perforations, has not prevented renewed infections. The possibility of closure of the perforation is slight, on account of the air oscillations; and the pendulum-like air movement only increases respiratory difficulties, the patient dying with dyspnea and cardiac weakness resulting from oxygen deficiency. In probably no case can the cause of the spontaneous pneumothorax occurring in artificial pneumothorax be determined with certainty during life. The diagnosis is not always easy since the classical symptoms do not occur together, but the dyspnea and sharp temperature rise are characteristic. The physical findings rarely change, but the course and development of pyopneumothorax are material aids in diagnosis, when associated with high fever and a small rapid pulse. The characteristic manometer findings cannot be mistaken. The outcome depends upon the size of the pulmonary perforation and the resistance of the patient. If the perforation closes, all the respiratory and toxic symptoms disappear. Opinions differ regarding treatment; but a removal of the pus at intervals and coincident introduction of nitrogen to maintain the same pressure relations seem to be the most logical. The use of a fine trocar, to avoid needle track

and skin infection, is more acceptable to the patient than thoracoplastic operations. On account of the danger of fistulas the latter does not seem advisable.—*Über Spontanpneumothorax als Komplikation bei künstlichem Pneumothorax, T. Landgraf, Beitr. z. Klin. d. Tuberk., November 25, 1921, xlv, 373.*

Death Following Artificial Pneumothorax.—The needle was introduced into a pleural space which communicated with a bronchiectactic cavity. Because of the induration of the cavity wall the puncture did not automatically close when the needle was withdrawn, hence the sequence of events was as follows: entry of inspired air from the bronchus into the cavity, through the needle opening into the pleural cavity. Upon expiration the opening was too small to permit the passage of the air from the pleural space to the outside. No cavity had been discoverable by X-ray examination or physical findings. Upon introduction of 400 cc. of nitrogen gas into the chest no change in the manometer was seen, leading to the suspicion that either a bronchus or a cavity had been entered. Cyanosis and death occurred four hours after the attempted pneumothorax.—*Kasuistischer Beitrag zur Pneumothoraxbehandlung, E. Mory, Ztschr. f. Tuberk., February, 1921, xxxiii, 272.*

Surgical Treatment of Pulmonary Tuberculosis.—Suitable for the Sauerbruch operation are advanced cases of unilateral pulmonary tuberculosis, or predominately one-sided cases, which according to statistics at Davos are about 10 per cent of all cases. If from these are subtracted those in which artificial pneumothorax is indicated, there remain only 5 per cent suitable for the operation. The best cases are the chronic fibrous forms with cavitation, because these already have a tendency to proliferation of connective tissue and shrinkage. The X-ray shows displacement of the mediastinum and the trachea, and a higher position of the diaphragm on the diseased side. The methods of constricting and of putting the diseased side at rest are pneumothorax and extrapleural thoracoplasty. Where there are no pleural adhesions artificial pneumothorax is unquestionably indicated. Extrapleural thoracoplasty is never attempted if pneumothorax can be induced. If the upper lobe is adherent and the lower lobe normal, the combination of partial rib resection of the upper thorax and artificial pneumothorax of the lower lobes is ideal. In most cases the operation of choice is complete constriction of the diseased side by rib resection from the first to the eleventh ribs. This never collapses the lungs as completely as does total pneumothorax, since in a complete resection a decrease of volume amounting to only 300 to 500 ccm. occurs. When expectoration is slight, ether narcosis is perfectly safe. Extended observation of tuberculous cases shows that ether is not harmful to them; in fact, the analeptic action of this anaesthetic is beneficial. In cases with weak cardiac action, local anesthesia with 0.5 per cent solution of novocain and adrenalin is used; 150 to 200 ccm. of this solution are adequate for the most extended operation. In cases in which artificial pneumothorax accomplishes only an incomplete collapse of the lungs, because of adhesions and scar tissue, a combination of pneumothorax and rib resection often accomplishes the collapse. After resection the lung is freed extrapleurally of its adhesions until it collapses of its own accord. The hollow place is tamponed and permitted to heal by granulation. It may be filled in with fat or with paraffin. The latter does not always heal without producing a reaction or breaking through the pleura. The opening of cavities filled with fetid necrotic matter is accomplished by resecting a rib or more over the cavity. The resulting lung fistula is then obliterated by a plastic operation of the soft parts.—*Die chirurgische Behandlung der Lungentuberkulose, F. Sauerbruch and A. Brunner, Zeitschr. f. Tuberk., May, 1921, xxxiv, 335.*

Arthrodesis of the Tuberculous Hip Joint.—In order to hasten healing, of the tuberculous joint, a bone graft is implanted paraärticularly, between the trochanter and the rim of the acetabulum, to bring about artificial ankylosis. Eight patients were so treated in 1920 with prompt cessation of pain. In two weeks they could walk with but slight support, and in five to six months without any support whatever.—*Die Arthrodese durch paraärtikuläre Knochenspaneinpflanzung bei Hüftgelenkstuberkulose, M. Kappis, Zentralbl. f. Chir., July 16, 1921, xlviii, 990.*

Operative Treatment of Surgical Tuberculosis.—So called conservative, for instance, nonoperative treatment of tuberculosis of the bones and joints has its place, which is also true of its operative treatment. Bier has rather warmly and indiscriminately advised the former. Data and indications are presented on the operative care of such cases. No statistics have thus far been given to indicate the final outcome and permancy of nonoperative therapy. A table is given which attests to the value of surgical treatment. It is based upon 2000 resections performed by distinguished German surgeons:

Results of joint resection for tuberculosis

CLINIC, AUTHOR, YEAR	JOINT	LENGTH OF OBSERVATION	TOTAL NUMBER OF RESECTIONS	NUMBER OF SATISFACTORY FINAL EXAMINATIONS	END RESULTS WHERE OBTAINED		STATEMENT REGARDING THE FUNCTION OF THOSE HEALED
					Negative: patient died	Permanently healed	
		years					
Garré (Leonhard) 1913	Shoulder	19	16	10	2	6	Good.
Kocher (Lindholm) 1905	Shoulder	42	45	21	6	15	Good or very good.
König (W. König) 1906	Shoulder	16	44	44	11	36	Serviceable, including 10 with ankylosis.
Shoulder joint			105	75	19	57	= 76 per cent.
Mosetig (Damianos) 1904	Elbow	11	21	21	6	14	Good, no flail joint.
Bardenheuer (Lossen) 1907	Elbow	12	74	43	13	30	28 good results; 2 flail joints.
Garré (Leonhard) 1913	Elbow	19	38	31	6	25	0 flail joint; 21 good; 4 moderately.
Kocher 1915	Elbow	34	44	44	13	32	0 flail joint; 32 good.
König (Kosima) 1906	Elbow	15	108	81	36	42	3 flail joints; otherwise good.
Elbow			285	220	74	143	= 51 per cent.
Kocher 1915	Wrist		57	45	6	34	Good function.
Thomson 1905	Hip	19	37	37	4	24	Two-thirds good.
Niehaus (Perret) 1908)	Hip	17	17	17	0	17	16 entirely able to work; 1 partly so.
Schede-Bier (Vogel) 1909	Hip	9	16	15	7	8	7 thoroughly healed.
Garré (Nussbaum) 1913	Hip	19	52	37	9	28	All serviceable.
Kocher (Stoller) 1915	Hip	12½	31	31	11	16	15 able to work; one not.
König 1906	Hip	20	274	198	48	114	109 walk well; 5 poorly.
Hip joint			427	335	79	207	= 62 per cent.

V. Bruns (Blanel) 1904	Knee	27	385	279	74	280	330 were successfully, 46 unsuccessfully resected.
Schede-Bier (Vogel) 1909	Knee	9	32	22	7	15	15 good.
Wolfer (Linhart) 1909	Knee	2–13	50	46	7	26	1 flail joint
Solimani 1910	Knee	2–13	41	38	0	33	32 good; 1 flail joint.
Helferich-Anschütz (May) 1913	Knee	5–13	57	60	14	44	All good.
Garré (Els) 1913	Knee	19	268	188	14	144	144 perfect.
Kocher {Garnier / Schlettowsky} 1915	Knee	17	20	20	1	15	15 perfect.
	Knee	13	30	28	9	14	2 amputated, rest good.
König 1906	Knee	18	300	188	31	132	
Helferich-Anschütz (Brandes) 1912	Knee	5–13	19*	14	3	11	There were 14 firm ankyloses.
Knee joint			1202	983	160	714	= 72.6 per cent.
Helferich (Papendick) 1907	Ankle joint	10	17	17		11	11 good results.
Madelung (Ohse) 1909	Ankle joint	2–12	115	71	23	42	40 good.
Bardenheuer (Frank) 1909	Ankle joint	2– 6	45	30		27	25 good; 2 flail joints.
Garré (Syring) 1913	Ankle joint	19	97	94	7	59	Function in 58 per cent good to excellent.
König (Mass) 1906	Ankle joint	14	102	62	9	35	Function good, 2 had fistulae.
Ankle joint			376	274	39	174	= 66.4 per cent.
Total number				1932	377	1329	

* Children.

A number of cases are given in detail with X-ray pictures, in support of the contention that the nonoperative treatment alone of tuberculosis of the bones and joints is not by any means adequate but that resection of these conditions is indicated in the following cases: 1. When tuberculosis of the bone, especially in the neighborhood of a joint has been definitely diagnosed, resection is indicated when this process breaks through into the joint. 2. When secondary infection has set in. 3. In cases of nonosseous joint tuberculosis when, in spite of nonoperative treatment, the process is progressive, pus forming and erosive, the time of expectant treatment should not be so prolonged as to eventually necessitate complete amputation of the limb. 4. It is usually easier to come to a decision as to resection in the case of adults, but even in children the above indications are to be relied upon.—*Die operative Behandlung der chirurgischen Tuberkulose, F. König, Arch. f. klin. Chir., September 3, 1921, cxvi, 25.*

Opposite Lung in Artificial Pneumothorax.—A number of cases were studied roentgenologically, as well as physically, and it was found that in cases in which the contralateral lung showed improvement, following artificial pneumothorax, the improvement is to be ascribed to an already manifest tendency on the part of the patient to scar-formation, contraction of the lung and chronicity of the process. However, this spontaneous healing tendency can be favored by the administration of pneumothorax. The unfavorable effect of pneumothorax on the opposite lung seems to be due to inadequate observation of this lung previous to administration; hence, observation of patients for two or three months before administration of pneumothorax should be carried out.—*Über den Einfluss des künstlichen Pneumothorax auf die Kontralaterale Lungenhälfte, E. Schill, Ztschr. f. Tuberk., December, 1920, xxxiii, 149.*

Artificial Pneumothorax Therapy and Insurance Companies.—On the basis of data obtained from 20 cases treated during 1911–1916, of which 18 died subsequently, it might be argued that this mode of treatment is valueless in restoring consumptives to working status. It is, however, explained that these data were obtained at a time when pneumothorax was performed on only the severest cases with a bad prognosis. Entirely different results were obtained with 58 cases treated from 1917 to 1920. Only 7 (12 per cent) died; and of the 51 still alive, 31 were still being treated and of these 19 were capable of working, while in 20 treatment was discontinued and of these 13 are able to work. It is advised that pneumothorax treatment be considered a favorable adjunct for insurance companies to use, especially since it prolongs the period of working efficiency.—*Pneumothoraxtherapie und Landesversicherungsanstalt, E. Dorn, Beitr. z. Klin. d. Tuberk., October 23, 1920, xlvi, 147.*

Nonoperative Treatment of Surgical Tuberculosis.—For the past seven years the nonsurgical treatment of so called surgical tuberculosis has been adhered to in the Berlin clinic with only two or three exceptions. The indications for operation such as generally given are not concurred in, namely: 1. So called extracapsular foci in the vicinity of a joint. These heal best under nonoperative treatment. 2. Large sequestra, with nonoperative treatment, are without exception absorbed and, it would seem, are utilized in the reconstruction of bone. This resorption occurs, not only in closed, but also in fistulous cases in which mixed infection has occurred. 3. Subluxations of joints which submit better to conservative than to surgical treatment. 4. Deep-seated cold abscesses should not be disturbed since they spontaneously disappear. 5. Old age is not a contraindication to conservative treatment, even as late as eighty-two years of age. This conservative treatment such as employed at Berlin consists of the following procedures: 1. Heliotherapy applied according to the method of Bernhard and Rollier. Too much is being said concerning the "decongesting" action of the sun, according to which the internal organs are deprived of blood in favor of the skin. As far as tuberculosis is concerned, the sun produces hyperemia in the deepest foci and also produces beneficial results in distant parts of the body. Regarding the specific action of the sun, there probably is no such action in the healing of tuberculosis. The two benefits derived from heliotherapy are the production of hyperemia in the foci and of more importance even is the fact that when heliotherapy is applied the diseased part is less disturbed in the way of changes in dressing, drainage tubes, and so forth. Even more important than heliotherapy, in the treatment of these slow-healing wounds, is to cover them, preferably with a water proof material, changing the bandages but seldom, and not evacuate the pus which is really the natural stimulant and nutrient for the formation of granulation tissue. On cloudy days artificial light with a Kisch apparatus is employed, and is preferred to violet and

ultraviolet rays since the entire solar spectrum is thus used. 2. The second conservative method is passive hyperemia. In order to attain success with this therapy, extraordinarily careful technique and proper dosage are necessary. The usual error is to produce too intense hyperemia. It is best, however, to combine passive hyperemia with heliotherapy and also with the internal administration of iodides. 3. Adults receive daily 3.25 gm. sodium iodide by mouth and children proportionately less. By itself iodide treatment is of little value, but when combined with passive congestion it almost certainly prevents the formation of cold abscesses and the overproduction of granulation tissue. Heliotherapy seems to create a tolerance to iodides and prevents iodism. Tuberculin is employed only in the aftercare, and in order to prevent recurrences. Friedmann's serum therapy, even in cases treated by him personally, shows no beneficial results. Plaster-of-Paris is no longer used under any circumstances, because fixation prevents application of this method of treatment and induces ankylosis of the joints. In joint tuberculosis the limb is put at rest in bed, if it be a lower limb; not so for an upper limb; but no fixation is applied. Contractures and faulty position are treated with traction which permits of freedom of movement. After the pain has ceased, the diseased joints are methodically exercised, always being careful not to permit the exercise to produce pain.—*Die konservative Behandlung der sogenannten chirurgischen Tuberkulose, A. Bier, Archiv. f. klin. Chir., July 21, 1921, cxvi, 162.*

Artificial Ankylosis of Tuberculous Hip Joint and Spinal Column.—The method of Kappis for fixation of the tuberculous hip, and of Polya for the tuberculous spinal column, by means of bone grafting were used successfully.—*Bemerkungen zur Knochenspanversteifung bei Tuberkulose der Hüfte und Wirbelsäule, J. E. Schmidt, Zentralbl. f. Chir., September 3, 1921, xlviii, 1271.*

X-ray Treatment of Pulmonary Tuberculosis.—The results are not due to the death of the bacilli, but to stimulation of the tissue to form rapidly growing granulations and scars. Caseous tissue should not be rayed; and only small doses should be employed in any case. Softening should never be brought about. The dose varies for different stages of disease. One often obtains a leucocytosis and occasionally a rise of temperature. The results may often show themselves in rapid clinical healing, increased weight, loss of temperature and improved objective findings, both by physical examination and X-ray. It is best to treat patients with latent or stationary, or only slowly progressive disease. Miliary and pneumonic types, or the mixed forms of these should not be rayed. Smallest doses are used at the start and then slowly increased. Single areas are rayed and intervals are determined by reactions. Patients must be kept at absolute rest. Combination of X-ray exposures with sunlight is advised. Pneumothorax cases are especially suitable.—*Über die Röntgenbehandlung der Lungentuberkulose, H. de la Camp, Kongr. f. inn. Med., Wiesbaden, Sitzg., April 18–21, 1921.*

Comparison between Operative and the X-ray Treatment of Tuberculous Lymph Nodes.—A comparison between the results obtained after operative and X-ray treatment of tuberculous nodes is best shown in the following tables, the cases treated being carefully selected to permit a fair comparison:

	NO RECURRENCE	RECURRENCE
1. Nodes operated upon in hyperplastic state	4	14
2. Nodes operated upon in softened state	4	9
Total	8	23
Per cent	26	74
1. Nodes X-rayed in hyperplastic state	18	2
2. Nodes X-rayed in softened state	6	1
Total	24	3
Per cent	89	11

These patients were examined from two to two and a half years after treatment, with results decidedly in favor of the roentgen therapy.—*Ergebnisse der operativen und der Röntgenbehandlung tuberkulöser Drüsen. Ein Vergleich ausgewählter Fälle, H. Tichy, Zentralbl. f. Chir., April 16, 1921, xlviii, 512.*

Improving Albee's Operation for Tuberculous Spondylitis.—The improvement consists in avoiding the rather bloody procedure, whereby the fasciae and muscles are removed from both sides of the spinous processes, by splitting the dorsolumbar fascia on only one side of these processes,

after which the cartilaginous points of the processes are cut through with a stout resection knife and then thrown back, exposing to full view the processes which can then be split with chisel and mallet.—*Zur Technik der Albeeschen Operation bei tuberkulösen Spondylitis, J. Hass, Zentralbl. f. Chir., May 21, 1921, xlviii, 709.*

X-ray Treatment of Laryngeal Tuberculosis.—Detailed reports are given of the treatment of laryngeal tuberculosis in 7 cases with marked improvement, exposing every 8–10 days alternately the front and both sides of the neck to 16–20X "Kienböck" with a hardness of 12 Wehnelt units (measured under 3 mm. of aluminum) and a 3.5 milliampere current. The healing is dependent upon the destruction of tuberculous granulation tissue, with stimulation and hastening of the formation of scar tissue. At the same time, the raying develops a local cellular immunity, and produces a local anesthesia. Local reactions with swelling of the infiltrate, occasioning increased cough and expectoration, with a feeling of dryness and swelling in the larynx, were observed in all the cases.—*Zur Röntgenbestrahlung der Kehlkopftuberkulose, J. Fleck, Beitr. z. Klin. d. Tuberk., November 25, 1920, xlv, 268.*

Organ Stimulation by X-Rays.—Small doses of X-rays stimulate cells whereas large doses destroy. The stimulation may be in regard to both function and growth. The author studied the influence of short radiations upon the secretory action of the liver, kidneys and pancreas of the dog. To determine the secretion of the gall bladder, a fistula was made in the gall bladder of a dog and a few hours after the operation it was rayed for ten minutes. This showed, at the end of exposure, a definite increase of the flow of bile and an increased amount. Likewise, after radiating for three hours the right kidney, there was always an increase in the output of urine and nitrogen. In the third animal, after a partial excision of the pancreas, the animal was sugar-free only once, and that was two days after two exposures of the X-ray, whereas in the others, on the eleventh day, 2.5 gm. of sugar were excreted.—*Organ Stimulation by the X-ray, W. Petersen and C. Saelhof, J. A. Med. A., 1921, lxxvi, 718.*

Miliary Tuberculosis Following X-Ray Treatment.—Miliary tuberculosis followed in one case of tuberculous bone disease and in another of tuberculous peritonitis treated with X-rays. The miliary tuberculosis seems to have been produced by the X-raying, since the condition in both of the patients previous to this therapy was improving.—*Bestrahlungsschädigung bei Tuberkulose, W. Vollhardt, Zentralbl. f. Chir., October 29, 1921, xlviii, 1586.*

Influence of Light on the Blood.—The direct action of light rays does not reach beyond the layer of pigment of the epidermis. The capillaries of the dermis take up the light energy and transfer it, so that the blood cells are very easily reached indirectly. The red blood cells are not changed. The leucocytes decrease but the lymphocytes are increased. These were the results in 16 children. There was no special difference between the action of sunlight and the quartz lamp. The increase of the mononuclears was at the expense of the polynuclears. There is no direct relationship between exposures and increased hemoglobin. The reaction is influenced by the age of the patient and the course of the disease.—*Der Einfluss des Lichtes auf das Blut, E. Aschenheim and S. Meyer, Zeitschr. f. exp. Pathol. u. Therap., 1921, xxii, 22.*

Action of High Altitudes.—Dogs that had been rendered anemic by bleeding or by pyrodin were placed in an atmosphere that had been exhausted down to 1000 or 1200 mm. of mercury, which corresponded to an altitude of 2300 to 2600 metres. The animals were also exposed daily for two to three hours to a carbon arc lamp of forty amperes, at a distance of one metre, and it was then that the reproduction of blood occurred more quickly than in the first part of the experiment. Therefore, it was concluded that the effective part of high altitude was not the lowered oxygen but the additional amount of sun rays. Air in the neighborhood of an arc lamp was also exhausted and dogs were placed in this area. Here also the blood reproduction was hastened, so that the author concluded that the carbon arc light produced substances which by inhalation caused regeneration of blood.—*Der wirksame Anteil des Höhenklimas, O. Kestner, Zeitschr. f. Biolog., 1921, lxxiii, 1.*

Middle Ear Tuberculosis and Sunlight.—Tuberculous otitis media can well be healed by sunlight; in fact, in any case of tuberculosis of the ear, in any stage or at any age, general and local radiations should be advised. At high or moderate altitudes the results are best, although we can also obtain them in the lowlands. The treatment with artificial radiations is also favorable, but cannot produce a cure. Of these, the carbon arc light offers best results. The

result depends upon how we can influence the primary focus. Operative treatment may also help, but it is not essential.—*Mittelohrtuberkulose und Sonne, A. Cemach, Monatschr. f. Ohrenheilk. u. Laryngo-Rhinol., 1920, liv, no. 8.*

Action of Rays on Blood Pressure.—Air from the neighborhood of a burning carbon arc lamp was led into a tracheal cannula of etherized dogs and blood pressure was determined. After fifteen to twenty minutes blood pressure began to fall and this lasted thirty minutes after inhalation was discontinued. This also occurs with human beings. Likewise, on cloudy days with a drop in barometric pressure, the same thing occurs.—*Die Wirkung der Strahlung auf den Blutdruck, O. Kestner, Zeitschr. f. Biolog., 1921, lxxiii, 7.*

Sunlight Treatment of Tuberculosis in Children.—The method of exposure at the Sanatorium Scheidegg is carried out according to Rollier. The greatest emphasis is placed upon pigment and the advantages of high altitude are especially emphasized. Surgical cases are treated with rest and linen bandages, but not plaster casts. Bier's hyperemia and internal administration of iodine are also carried out with sunlight. Lupus is excised, then bound up dry for a day and then treated with light and salves. Partigens are also offered to patients. The results were good especially in surgical tuberculosis. Sunlight treatment is particularly advised for bronchial node disease; however, open tuberculosis, without fever, also gives good results with these exposures. It is best to confine it to the fibrous types.—*Die Heliotherapie der kindlichen Tuberkulose. K. Klare, Kindertuberkulose, 1921, no. 2, 11.*

Bunsen-Roscoe Formula for the Action of Ultraviolet Rays on Bacteria.—This law states that the photochemical action of radiation is directly dependent upon the intensity and duration of the exposure. To test this with bacteria, the author varied the distance of the source of light and the intensity of radiation. The results verified the law and demonstrated the character of the bactericidal action as a pure photochemical action upon bacterial protoplasm.—*Die Gültigkeit des Bunsen-Roscoeschen Gesetzes für die Einwirkung ultravioletter Strahlen auf Bakterien, F. Lange, Desinfektion, 1921, ii, 51.*

Action of Ultraviolet Rays on Bacteria.—Experiments were carried out with saprophytes and pathogenic bacteria, as well as with spore-free and spore-bearing bacteria. The sporecarriers were exposed in the form of pure dilutions of spores and in the form of very young spore-free dilutions of bacilli. They were exposed to the ultraviolet rays of a mercury quartz lamp and the rays showed strong bactericidal action. The rapidity of the action was in a sense determined by the thickness of the suspension of bacteria. The pathogenic bacteria were killed most quickly in from fifteen seconds to one minute; the saprophytes were destroyed in three minutes. The spores were much more resistant than the vegetable forms, but even they were killed in seven minutes.—*Über die Einwirkung ultravioletter Strahlen auf Bakterien und Bakteriensporen, P. Potthoff, Desinfektion, 1921, i, 10, & ii, 41.*

Mercury Quartz Light in Surgery.—General radiations are recommended, the lamp being situated at a distance of one metre, beginning with three minute exposures and increasing this every day five minutes up to one hour. A reaction will determine intervals. For local application in freshly infected wounds, one wishes a strong irritation, and exposes for ten to twenty minutes at 30 cm. In tuberculous peritonitis general radiations gave good results. The exposures varied from 30 up to 200, and lasted over a year in certain cases. Operation or X-ray and air-baths were occasionally combined. Focal reactions were observed and softening of the lymph nodes. Thirty per cent of lymph node cases did not respond. Focal reactions were also observed in bone and joint disease. The action is an indirect one. The lamp is a rather poor substitute for sunlight. It is merely an adjuvant. A review of 103 references in the literature is also added.—*Die Quecksilberdampfquarzlampe in der Chirurgie, W. Budde, Ergebn. d. Chirurg. u. Orthorped., 1921, xiii, 97.*

Specific Therapy of Tuberculosis.—The following therapeutic rationale was observed in 15 reported cases: 1. If a vigorous reaction was desired Koch's O. T. was employed. In a case of acute pleurisy with a large amount of exudate, O. T. was used and the fluid was rapidly absorbed. 2. In fibrotic cases with proliferating foci (febrile or subfebrile) Much's partial antigen *MTbR* or inunction with O. T. or B. E. (used because of objection on part of patients to injections) was employed, with encouraging results in a number of cases reported in detail, with disappearance of moisture, increase in appetite, disappearance of night sweats and an improvement in the subjective symptoms of the patients. 3.

In progressive fibrotic cases with cavity formation the same procedure as under 2 was employed. 4. In slowly progressive forms Much's partial antigens, O. T. or B. E. were employed. 5. In acute cases no specific therapy at all was employed. Much's partial antigen therapy is beneficial and is harmless. Whether it excels other kinds of tuberculins is not certain, since O. T. and B. E. gave good results. In fact, it seems that the partial antigens cannot replace O. T. in all cases.—*Über spezifische Tuberkulosebehandlung unter besonderer Berücksichtigung des M TbR.-Verfahrens nach Deycke-Much, H. Hoffmann, Ztschr. f. Tuberk., April, 1921, xxxiv, 29.*

Tuberculin Treatment of Renal Tuberculosis.—In cases of unilateral renal tuberculosis that had been under observation from nine months to over three years, it was found that the administration of O. T. might bring about improvement and even cure of the condition, as manifested by recession of tuberculous processes at the mouths of the ureters, cessation of strangury, clearing up of the urine, improvement in about two months, or more, of renal function as gauged by the indigocarmine and phloridzin tests, and by improvement in the subjective symptoms. In 23 cases, after six to nine months of tuberculin treatment, the function of the diseased kidney was equal to that of the normal one, with no albumin and a negative guinea pig inoculation test. Hence it is permissible to assert that in well selected cases of unilateral tuberculous kidney, O. T. can obviate removal of that kidney.—*Zur konservativen Behandlung der Nierentuberkulose, E. Wossidlo, Zentralbl. f. Chir., August 20, 1921, xlviii, 1181.*

Percutaneous Therapy with Old Tuberculin in Pulmonary Tuberculosis.—The Petruschky (alcohol-glycerin-tuberculin) modification of the percutaneous Spengler treatment with tuberculin was found to be simpler and more easily available than other methods. Its action was also found to excel all others, having a favorable influence upon the chronic indurated and not too widespread nodose forms of pulmonary tuberculosis. The caseous-bronchopneumonic and the advanced acinous-nodose forms are not influenced, or are only temporarily arrested. During treatment, the Arneth blood picture correlates well with the reaction of the patient and runs nearly parallel with the pulmonary findings; while there is not always a correlation with the improved feeling of general wellbeing. In favorably influenced cases the eosinophile leucocytes increase.—*Über therapeutische perkutane Anwendung von Koch's alttuberkulin bei Lungentuberkulose, G. Pfeffer, Beitr. z. Klin. d. Tuberk., November 25, 1920, xlv, 287.*

Partial Antigens in Surgical Tuberculosis.—Seven cases of surgical tuberculosis were treated with partial antigens with no signs of improvement derived therefrom. No harm resulted from their administration, but no better results were obtained than with tuberculin (Koch's O. T.). The intracutaneous reaction was found unreliable.—*Erfahrungen über die Behandlung der chirurgischen Tuberkulose mit Partialantigenen, F. Landauer, Ztschr. f. Tuberk., February, 1921, xxxiii, 261.*

The Treatment of Tuberculosis with Partial Antigens.—After reviewing the various details of technique and giving the summarized statistics of Deycke and Altstedt the author's own conclusions without any data are given as follows. 1. Favorable influence obtained in (a) stage I cases of pulmonary tuberculosis, without fever and only slight complications, (b) stage II cases, without fever, with high reactivity but without complications. 2. Slight influence obtained in (a) stage III cases, without fever or complications and high reactivity and favorable nutritional conditions, (b) stage II cases, without fever with complications and a high reactivity. 3. No influence obtained in (a) cases with fever and (b) stage III cases with complications, even with a high reactivity.—*Die Behandlung der Tuberkulose mit Partialantigenen nach Much und Deyke, Kremer, Beitr. z. Klin. d. Tuberk., October 23, 1920, xlvi, 142.*

Petruschky's Tuberculin Liniment.—A two years' experience with Petruschky's tuberculin liniment, used mostly on fever-free patients by inunction, led to the conclusion that this method of treatment had a favorable action upon the tuberculous process and general well-being of these cases.—*Erfahrungen mit "Linimentum Tuberculini Compositum Petruschky," G. Frischbier, Beitr. z. Klin. d. Tuberk., October 23, 1920, xlvi, 11.*

Rosenbach's Tuberculin.—Rosenbach's tuberculin is supposed to be 100 times less toxic than O. T. The Pirquet test with this tuberculin, in 8 stage I, 11 stage II, and 4 stage III cases was negative, while O. T. gave a positive reaction in 16 of these. Therapeutically used on 119 cases, there were 31 in which the tuberculin was given without reaction, and objectively only slight

results were obtained in 16, while 17 gave no results, and 8 became worse. Slight fever occurred in 30. In 8 treatment had to be discontinued. The average gain in weight was 1.5 kg., being below the average obtained in nonspecific treated cases. As a whole, the results did not indicate any special value for Rosenbach's tuberculin.—*Erfahrungen über Tuberkulin "Rosenbach," G. Schellenberg, Beitr. z. Klin. d. Tuberk., October 23, 1920. xlvi, 121.*

Friedmann's Vaccine.—Since 1918, 110 cases of pulmonary tuberculosis of all grades of severity have been treated with Friedmann's vaccine. Advanced cases showed no improvement after injection; in fact, many have already died. In very few of the cases did absorption occur without any local reaction. In the mildest forms the local reaction consisted of infiltration and painful induration. Infiltration often persisted for weeks. Frequently (percentage of cases not given), in spite of the most rigid aseptic precautions, abscesses appeared at points of injection; one eight days after, another as late as one year. Moderately advanced cases showed improvement and exacerbation, such as are encountered without therapy of any kind. The improvement was often of brief duration; in some cases it was followed by tuberculosis of the larynx and, in 1 case, of the gums. Of 51 incipient cases kept under observation for from four months to two and one-half years, 31 became worse, and of these some were cases with a good clinical prognosis. Shortly after injection 46 cases developed hemoptysis.—*Erfahrungen mit dem Friedmannschen Tuberkulosemittel, W. Unverricht, Ztschr. f. Tuberk., February, 1921, xxxiii, 193.*

Friedmann's Remedy in Pulmonary Tuberculosis.—In 1914, 31 cases of pulmonary tuberculosis with fair prognosis were treated with Friedmann's vaccine. The condition of 30 of these is reported after six years. In 24 a negative result was obtained,while 6 showed a good or definite effect. Of the 30 treated, 17 were dead after six years. The course of the disease was in no way affected by the injections, as compared with the results obtained with physical-dietetic treatment without injections.—*Meine Resultate mit dem Friedmannschen Tuberkulosemittel bei Lungentuberkulose, F. Köhler, Beitr. z. Klin. d. Tuberk., October 23, 1920, xlvi, 80.*

Hetero-Serum Therapy in Tuberculous Serofibrinous Pleurisies.—The classification of serofibrinous pleurisies into primary and secondary pleurisies has the defect that it fails to take account of the many pleurisies which have both primary and secondary features and of which the future is so difficult to predict. What value has the clinical examination for the prognosis of a pleurisy? Three special features may furnish important information. These are its manner of evolution, its temperature curve, and the subject's reaction to tuberculin. A pleurisy that does not begin frankly and that lasts more than a month has, generally, a grave outlook. A pleurisy of good prognosis is severe and short. In severe pleurisies the fever is high, 40° or more, or, if it is moderate, the temperature is very irregular with slight oscillations of less than a degree. A pleurisy that will evolve favorably and not require puncture has a temperature curve with regular frank oscillations. Beginning high (39°), it describes in three or four weeks a regular lysis curve. Properly made, the tuberculin test is very instructive. The reaction is always very perfect in pleurisy *a frigore*. In the doubtful pleurisies the reaction is variable but always imperfect, sometimes absent. Good cutaneous reactions are never red, but pink with a centre uncolored or yellowish, always distinctly papular, sometimes vesicular. They appear within twenty-four hours and indicate a benign pleurisy. The imperfect reactions may be red or dark purple. They belong usually to pleurisies of the secondary type, accompanying fibrocaseous pulmonary tuberculoses with a bad prognosis. The content of the pleural liquid in complement, agglutinin, precipitin or opsonin gives no constant reliable information as to the future course of an effusion. But the bacterial content and the coagulability of an effusion stand in certain constant relations to the clinical findings and the evolution of the disease. An amount of fibrin greater than 0.5 gm. to the litre indicates a benign effusion and a rapid cure. Two procedures are needed for bacteriological examinations. One, suitable for blood and for very hemorrhagic coagulable effusions, consists in mixing 1 cc. of the bloody liquid with 10 to 15 cc. of a mixture made of 500 cc. of 28 per cent alcohol and 1 cc. of 22 per cent hydrochloric acid. This will leave the leucocytes with their nuclei intact and will show phagocytic action particularly well. The other procedure, to be used with serofibrinous fluids without many red cells, consists in digesting the clot in a mixture of pepsin, 0.20 gm.; fuming hydrochloric acid, 0.2 gm.; 90 per cent alcohol, 10 ccm.; distilled water, 90 ccm. The mixture is kept in a thermostat at 50° and shaken occasionally. In two hours the digestion should be finished and the mixture centrifu-

galized at a low velocity for two minutes, poured off and recentrifugalized thoroughly. This precipitate is then treated by Ziehl's method. If bacilli are abundant enough to be easily found the pleurisy is a grave one which will be endlessly prolonged, or, sooner or later, a frank pulmonary tuberculosis will ensue. If the bacilli are very rare or are not found it is a pleurisy *a frigore*. In the first case, the bacilli are generally granular, moniliform and very acid resistant; in the second case they are short, homogeneous and more easily decolorized. Judging from a hundred cases observed since 1903, these differences seem to hold without any exceptions. These easy and sharp differentiations of benign and grave effusions are exceedingly valuable for their therapeutic indications, A benign pleurisy of the Landouzy type tends to a spontaneous cure and needs no serum treatment. Its treatment should be symptomatic, aided, in case of need, by removal of fluid. Doubtful pleurisies, that is, those which constitute intermediate forms between so called primary and secondary pleurisies, may be treated either by specific antituberculous horse serum or by human auto or hetero serotherapy. Only the two latter forms of treatment are considered here. The first of these, that is, reinjection of liquid from a pleural effusion under the patient's own skin, has been shown by numerous clinical reports to be of little use and to be subject to considerable danger. An examination of the cases reported as favorable shows that they almost all belong to the pleurisies *a frigore*. Experimental injection of guinea pigs with pleural effusions has shown that in grave pleurisies tuberculization is produced in about half of the cases by a dose of 2 cc., and in nearly all cases by a dose of 5 cc.: 20 cc. causes death from tuberculosis to occur so rapidly that the granulitis may pass unperceived; a dose greater than 20 cc. generally produces death by intoxication. The tuberculogenic behavior of the effusion is not influenced by the age of the pleurisy, which shows that the liquid in a grave pleurisy does not become sterilized but retains its full virulence through long periods. It may even increase in virulence in the long run. The liquid from frank, benign pleurisies, with a term of three weeks, behaves altogether differently when injected into guinea pigs. Here, quite different results are produced by inoculation at the beginning and toward the end of a pleurisy. In a beginning pleurisy the minimum dose for tuberculization of a guinea pig may be put at 5 cc. Between 10 and 15 cc. the largest number of positives is obtained, but the percentage seldom exceeds 60. The dose cannot be pushed as far as in the malignant pleurisies, because of the toxicity of the liquid. But a benign pleurisy, on the wane, behaves in a quite different manner which is designated an *inoculation paradox*. The peculiarity consists in this: the tuberculizing power of the liquid is not a simple function of the volume injected; the positive results increase up to a maximum, variable for different subjects, and above this maximum the proportion of positives decreases regularly up to a point at which the dose becomes completely ineffective. But if, instead of injecting the total pleural liquid, the corresponding clot is injected, the proportion of positives is greater than with the entire liquid and this proportion increases regularly without a maximum. In effect, the clot behaves like the total liquid from a malignant effusion. The anomalous behavior of the liquid from a benign effusion must, then, come from its serum, and it is necessary to suppose that the clot and the serum possess antagonistic properties. The clot, virulent by reason of the bacilli that it contains, has a virulence proportional to its amount. The serum has an antagonistic action, insufficient in small doses, but increasing faster than the pathogenic power to the total liquid, to such a degree that it ends by inhibiting the virulent effects. Other experiments confirm this interpretation. The opsonins have been shown to attain a maximum when a pleurisy is on the point of resolution, and the writer has demonstrated a curative effect of certain pleural sera on tuberculosis in small animals. These facts suggest a rational therapy, namely, treatment of grave pleurisies by injection of serum from a benign effusion removed at a stage when its antitoxic power is considerable. The opportune moment of choice constitutes the chief difficulty. It must not be too early, while the effusion is still toxic; nor too late, when the quantity of the effusion may be too small. The injection, made subcutaneously, should be at least 40 cc. from the beginning of treatment. The liquid, drawn under aseptic precautions, should be allowed to clot for twenty-four hours on ice, the serum pipetted off into sterile flasks, and freed from virulence and toxicity by intermittent sterilization at 56°. The hetero-serum therapy carried out in this way has, so far, given promising results, but the uncertainties connected with pleurisy take a long time and many cases are needed before its value can be fixed precisely. The "shock" symptoms recorded do not differ from the accidents common to injections of foreign sera. From the point of view of serum therapy the pleurisies have but two cate-

gories. In one are the benign pleurisies of which the effusion has therapeutic properties toward the end of its course; in the other, are the grave pleurisies of which the effusions have always an uncompensated virulence which renders them unsuitable for use at all times and in all doses.—*Considerations sur le pronostic et le traitement des pleurésies séro-fibrineuses bacillaires l'hétéro-sérothérapie, A. Jousset, Rev. d. l. Tuberc., October, 1920, i, 307.*

So Called Neutralization Phenomenon in Tuberculosis.—The Grete Singer (*Jahrb. f. Kinderhk., 1918*) technique for determining the tuberculin neutralizing power of the serum from 85 tuberculous and 59 other patients was used: 0.9 cc. patients' serum was mixed with 0.1, 0.01, and 0.001 mgm. O. T. and incubated for twelve hours at 37°C., and then placed in the ice box for 5–7 hours, after which 0.1 cc. of the mixture is injected intracutaneously, using as controls tuberculin saline mixtures of the same concentration, saline solution alone, and serum alone. Entire agreement with Sorgo (*Wien. klin. Wchnschr., 1913, H. 45.*) was obtained, indicating that the Pickert-Löwenstein (*Ztschr. f. Tuberk., 1910, Bd. xv.*) phenomenon of neutralization is not one of specific antibodies of the character of antitoxins. The reported findings, especially the paradoxical reactions, make it seem possible that nonspecific factors of serum and integument account for these reactions. The contention of Grete Singer that active tuberculosis could be determined with the aid of the neutralization phenomenon could not be corroborated. Equally unreliable are the results of this method for prognosis in tuberculosis of adults.—*Zur Frage des sogenannten Neutralisations-phänomens bei Tuberkulose, A. Kirch and B. Szigeti, Beitr. z. Klin. d. Tuberk., November 25, 1920, xlv, 325.*

Tuberculosis Immunity Studies with Deycke-Much Partial Antigens.—A classification of 35 clinical cases is made on the basis of the intracutaneous (*I*) and complement (*C*) titre as follows: 1. *I* titre strong, *C* titre strong; 2. *I* strong, *C* weak; 3. *I* medium, *C* weak; 4. *I* weak, *C* strong; and 5. *I* weak, *C* weak; and a parallelism is drawn between decrease in cellular basic immunity and clinical effect of biological activity of the organism. In the cases with equal basic cellular immunity the status was better in those possessing more antibodies in the blood. It is evident from this that the complement fixation titre originates from the same source as the intracutaneous titre, and is developed from the same cellular function. Without a doubt the complement binding partial antibodies also protect against tuberculosis in natural immunity. Cellular and humoral antibodies are not distinct entities, but are preferably to be called antibodies of cellular origin. Cellular immunity is the basic immunity. The quantitative changes in the intracutaneous titre, at repeated tests, were insignificant in individual cases, and did not contradict the general condition of the patient. An absence of absolute parallelism between the two titres is due to the fact that both are evidences of the same biological function, but in substance are different factors of immunity. A parallelism must not necessarily exist. The quantity of humoral antibodies (complement binding value) varies with the activity and clinical picture; in stationary cases, where the immunity is good, there may be very little variation. This titre is an index of activity. The complement titre is never an index of the formed, but of the unused antibodies circulating in the blood. The reactivity of the skin seems to be a reliable index of the general cellular reactivity. This is indicated by the relation between the cellular and humoral immunity, the relation of both of these to the clinical picture, and the results of the parallel studies of the blood and exudates. Coincident studies of the blood and pleural exudates revealed, qualitatively, absolutely parallel findings (and always more antibodies in the exudate). We can infer that the antibodies in the exudate not only arise from the blood, but are also products of the endothelial layer, indicating that cellular immunity is the same qualitatively in the different tissues (the quantitative differences in absolute values could be explained by the reaction of the inflamed tissues). The type of irritation seems to have little influence upon the outcome, when once the allergic condition of the cell exists, making it capable of giving off its "secretion product."—*Tuberkulose-Immunitätsstudien mit Hilfe der Deycke-Muchschen Partialantigene, E. Szasz, Beitr. z. Klin. d. Tuberk., November 25, 1920, xlv, 461.*

General and Cutaneous Tuberculin Allergy.—It seems that a distinction should be made between general (systemic) and cutaneous allergy. Often these parallel each other; but not necessarily so, and especially in patients with a subfebrile temperature, or those who have a tendency to a rising temperature and may react weakly to the cutaneous but strongly to a small dose of tuberculin administered subcutaneously. There appears to be a certain antagonism

between pulmonary and skin tuberculosis, for one seldom finds in the same patients a serious pulmonary tuberculosis with a skin tuberculosis. One can thus understand better why, when the cutaneous reaction which was weak becomes stronger, the lung condition improves, and the general tuberculin reaction, which was strong, becomes weak under these conditions. This antagonism between skin and lungs seems to be attributable to the lymph node system. A case was observed in which a pulmonary tuberculosis patient with tuberculous lymph nodes showed a diminution of the diseased lymph nodes simultaneously with an exacerbation of the pulmonary process. Hence, it seems that a strong cutaneous reaction speaks for a good prognosis in pulmonary tuberculosis but for a poor one in scrofulosis. It is possible that a lively general allergy is combined with an hypersensitivity of the lung tissue to the tuberculosis virus, similar to the increase in sensitivity of the skin upon the exacerbation of a tuberculous skin process. Similarly, heliotherapy produces its beneficial effect, not by direct action upon the lung tissue, but by an indirect one via the skin. Hence, a strong cutaneous reaction may not be an indicator only of the presence of numerous antibodies, but it also speaks for a strongly functioning skin; and Karczag demonstrated that the cutaneous allergy of white guinea pigs is greater than that of the colored pigs; but with the progress of the tuberculous process in the pigs the cutaneous allergy of the white pigs decreased while that of the colored pigs increased. In other words the allergy of the skin can be raised without the general allergy being influenced thereby.—*Allgemeine und kutane Tuberkulinallergie, K. Dietl, Ztschr. f. Tuberk., April, 1921, xxxiv, 38.*

Immunity in Tuberculosis.—Various chronic infections such as syphilis, trypanosomiasis, Texas fever of cattle, and malaria with a definite immunity, which is however incomplete, labile and vacillating, are compared in respect to immunity, with tuberculosis. These diseases resemble tuberculosis. The kind of immunity which they establish is what can be expected of a chronic disease in contradistinction to the strong definite immunity established by diseases with an acute course.—*Über Immunität gegen Tuberculosis, F. Neufeld, Zeitschr. f. Tuberk., May, 1921, xxxiv, 312.*

Artificial Immunity to Tuberculosis.—Zeuner-Broll's method of immunization with weakly virulent tubercle bacilli was found to be unreliable. That of Loeffler, immunizing rabbits by repeated intravenous injections of tubercle bacilli dried at 65–70°C., resulted unsatisfactorily, since the treated animals and the controls all developed equally extensive miliary tuberculosis.—*Über Tuberkulose immunisierungs Versuche, L. Lange, Centralbl. f. Bakt., February, 1921, lxxxv, 26.*

Tuberculin Reaction and Specific Hypersensitiveness in Bacterial Infection.—Zinsser comes to the following conclusions based on a series of experiments: I. In guinea pigs two fundamentally different types of reaction may be observed. One of these is the immediate, transitory reaction which develops in animals sensitized against proteins (horse serum, etc.) and may be regarded as one of the manifestations of general protein hypersensitiveness, or anaphylaxis; the other is the tuberculin type of skin reaction which develops more slowly, leads to a more profound injury of the tissues and is independent of anaphylaxis as ordinarily conceived. 2. The tuberculin type of hypersensitiveness, as well as probably the typhoidin, mallein, and abortin reactions, does not develop at all in guinea pigs sensitized with proteins, like horse serum, etc. While this form of hypersensitiveness may eventually be induced with materials not bacterial in origin, it has been observed up to date only as a reaction of bacterial infection. 3. Methods of treatment with protein material from bacterial cultures which sensitize guinea pigs to anaphylactic reaction with the bacterial extracts, do not sensitize them to the tuberculin type of reaction. Such sensitization is easily accomplished only by infecting the animals with living organisms. No reliable method of sensitizing guinea pigs to such reactions with dead bacterial material has as yet been worked out, though a few hopeful experiments have been obtained with massive injections of large amount of the acid precipitable substances (nucleoproteins?) from bacterial extracts. In animals made hypersensitive to the tuberculin type of reaction by infection with living bacteria, the reaction may be elicited by intracutaneous injections of bacterial extracts from which all coagulable proteins, nucleoproteins, and Bence-Jones proteins have been removed, as well as this can be done by boiling with acid, etc. This proteose residue alone suffices to elicit such reactions. The exact chemical nature of the so called proteose residue must be further studied and analyzed.—*Studies on the Tuberculin Reaction and on Specific Hypersensitiveness in Bacterial Infection, H. Zinsser, Jour. Exper. Med., November, 1921, xxxiv, 495.*